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FIELD CROP ABSTRACTS

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CORRIGENDA

Abs. 62 and 65,	in title	for *Agric. Engng* read *Agric. Engng, St. Joseph, Mich.*
Abs. 84,	line 3	delete Catania
Abs. 89,	line 9	for Novit read Norit
Abs. 93,	line 16	for Eusi read Ensi
Abs. 110,	in title	insert by *R. Baldoni.*
Abs. 129,	in title	insert [Extract from Seeds Catalogue] before address
Abs. 146,	line 32	for Yelder read Yielder
Abs. 180,	in title	for *Convolvolus* read *Convolvulus*
Abs. 252,	line 12	for *Ryanex* read *Ryania*
Abs. 357,	line 6	for *Cevthorrhynchus* read *Ceuthorrhynchus*
Abs. 374,	line 12	for Bioloxi read Biloxi
Abs. 379,	line 4	for *Spinacea* read *Spinacia*
Abs. 444,	line 3	for Sahira read Bahira
Abs. 495 and 499,	line 9 & 17	for *Thalaspi arvense* read *Thlaspi arvense*
Abs. 582,	line 16	for *Ascochita* read *Ascochyta*
Abs. 615,	line 4	for *Corchocus* read *Corchorus.*
Abs. 794,	in title	for *Z. Pfl-enkran Pfl-enschutz* read *Z. PflKr. PflSch.*
Abs. 880,	line 3	for *Diobrotica* read *Diabrotica*
Abs. 1113,	in title	for *Sci. Agric.* read *Canad. J. Res.* Sec. C.
Abs. 1143,	line 16	for *L. ocrus* read *L. ochrus*
Abs. 1194,	line 7	for Viclana read Vicland
Abs. 1241,	line 11	for *Acoros* read *Acorus*
Abs. 1287,	lines 2, 7, 15	for thiamine read thiamin
Abs. 1293,	in title	insert **18** after *Curr. Sci.*
Abs. 1361,	lines 2, 3, 9, 10	for Lival read Liral

Corrigenda for Content pages in Nos. 1, 2 and 3

Abs. 305, for *Rhizoctonia soloni* read *Rh. solani*
Abs. 555, for *Ustilago triciti* read *U. tritici*
Abs. 630, for *Urina labata* read *Urena lobata*
Abs. 906, for Kloster P. read Kloster pea
Abs. 925, for Unang read Yunnan
Abs. 939, for Barbaton read Barberton

FIELD CROP ABSTRACTS

LAND UTILIZATION AND MANAGEMENT

STAMP, L. D. **Land use in Yorkshire.** *J. Min. Agric.* **55.** 139-42. 1948. **1**

Yorkshire as a whole falls naturally into three clear divisions—the Pennines and the Pennine slopes and valleys in the west, the lowland area of the Vale of York in the centre and a varied series of uplands and valleys, or lowlands, in the east. The latter include the Cleveland Hills, the North York Moors, the Vale of Pickering, the Yorkshire Wolds and Holderness. Each of the divisions has its own distinctive land use and type of farming.

The higher ground of the Pennines is usually occupied by moorland which is traditionally sheep pasture. On the margins of the moors there are small dairy farms engaged in production of milk for consumption in nearby towns. In the essentially flat Vale of York soils and consequent land use and type of farming are very closely related to the superficial glacial deposits. Where the deposits are sandy one finds either heathland or light carrot or beet soils, useful though liable to blow and needing frequent marling. Elsewhere the soils are more of the nature of silt and afford some excellent arable soils well suited to a variety of crops. Toward the north, part of the Vale is occupied by the heavier boulder clay, usually marked by an increase in the proportion of permanent grass, while on the western margins of the Vale there is a very valuable arable belt.

The Cleveland Hills with a porous sandstone subsoil are largely occupied by heather and afford excellent sheep pastures. The Vale of Pickering, a flat floored valley with excellent soils of fenland type is capable of intensive cultivation but in places gives way to marshy fields, still suffering from a water table which is too high to permit of regular arable cultivation. The Yorkshire Wolds consisting of rolling chalk country, are largely overlain by boulder clay, and afford light land of barley/arable/sheep type. Holderness, a low lying boulder clay-covered plain with a gently undulating surface, is very largely under arable cultivation, providing in parts some excellent wheat land.

The article is illustrated by a generalised relief and drainage map of Yorkshire and a map showing types of farming in Yorkshire, prepared by the Survey Section of the Economics Branch of the Ministry.—G.M.H.

ASHBY, A. W. **Some economic aspects of planning land uses.** *J. Proc. agric. econ. Soc.* **7.** 22-8. 1946. **2**

Mention is made of the lack of measures of present allocations and uses of land, although there is an increasing amount of useful information becoming available. Among the problems of land use in agriculture, size and lay-out of farms receives attention. Several conditions necessitate close consideration of this problem, not least among them being changes in technical knowledge and experience in ley farming and the production of home grown feed for stock.

The broader aspects of planned land use are based on the fact that uses of land are socially determined. There are three problems which are said to have received insufficient attention, namely the problem of the dereliction of land, the problem of the recovery of land which has become derelict, and the problem of the retirement of land.—T.G.J.

PAYNE, G. E. **Gloucestershire. A physical, social and economic survey and plan.** 26 × 18. pp. 327. Gloucester: [1948] 20s. **3**

This work sets out clearly the results of a comprehensive physical, social and economic survey of Gloucestershire and ends with certain recommendations and conclusions for its future development. It is emphasized that the recommendations and conclusions are those of the author and do not necessarily represent the views of the County Council or the Joint Planning Committees. The book will nevertheless provide information which will undoubtedly be of considerable value to those bodies in the preparation of a master plan.

The first nine chapters are devoted to the physical and historical background of the county, Chapters IX to XVII to population, agriculture, industry and social services, the six following chapters to accessibility of the various forms of transport, and the book concludes with a chapter on housing and conclusions and recommendations.

In Chapter XI which deals with Agriculture and Woodlands, we have first a very comprehensive account of the types of farming of the county based on the "Types of Farming Map of England and Wales" issued by the Ministry of Agriculture and Fisheries. Of the twenty divisions into which the land of the country is divided, nine appear in Gloucestershire. The information on the grasslands of the county which follows is taken from the report on the subject by Sir George

Stapledon in which it is noted that there is no precise conformity to geological conditions of the eight categories selected for the grassland survey of the whole of the lowlands of this county, the two best groups, in which first and second grade ryegrass pastures predominate, do not occur in Gloucestershire. Soil fertility within the county, its potentialities and characteristics are described in some detail and are followed by information and a map showing surface utilization. A summary of Professor A. W. Ashby's views on the factors influencing productivity of land and Sir George Stapledon's opinions on the factors necessary for agriculture to function properly are also included in this chapter.

The results of this detailed and efficient survey are presented in concise form. There is a good selection of photographs to illustrate the text and some very useful maps giving cartographical representation of the considerable amount of statistical data available. This attractive and readable book is therefore likely to prove of considerable practical value and can be recommended to all who are interested in public affairs, especially those responsible for the production and presentation of regional surveys and plans for other areas.—G. M. Howe.

THOMBSON, C. K. **Hill drainage.** *J. Brit. Grassl. Soc.* **3.** 193-201. 1948. **4**

The history of hill drainage and the numerous problems involved in the hill lands of the North of England are discussed. Lack of knowledge of the fundamentals of drainage, the employment of unskilled operatives, and badly designed schemes are cited as some of the reasons why drainage in certain cases is ineffective. Mechanization is thought to offer a solution to the major problem, a suitable machine being available (though still requiring a special motive power unit because crawler tractors are proving inadequate) which performs the work satisfactorily and economically. In the majority of cases drains running diagonally across the hill slopes have proved more effective than drainage schemes which run up and down the hill.—G.M.H.

ENGLEDOW, Sir F. **Agricultural development in the British Colonial Empire.** *J. Proc. agric. econ. Soc.* **7.** 321-50. 1948. **5**

The Colonial territories, occupying some 2.215 million square miles are primarily agricultural. Among the means of increasing the living standards in the colonies, an increase in the cash income of the peasant cultivator receives considerable attention. It is emphasised that an increase in cash cropping at the expense of staple foods may jeopardise the stability of the agricultural systems. There is need for a clear agricultural policy for every territory. There is an absence of prime agricultural data, especially with regard to cropping, grazing and livestock information. Little has been done to estimate the area of land and the amount of labour needed to support a family. Climate and soil must be looked to as the bases of future agricultural development, and the author quotes an American source to illustrate the vegetation types of the world's surface. Of the land surface, 25.72 per cent is classified as grassland. All the openings for better use of agricultural land fall into four groups: organisational; scientific; improved methods; and improved farming systems. Breeding for resistance against pests and diseases, and possibly the introduction of new crops, are recommended as methods of improving productivity. The types of crops that are and may be grown are influenced by the labour problem in that seasonal labour requirements tend to restrict such crops to peasant holdings. Increased mechanization can offset this, and future developments may exert great influence on farming systems.—T.G.J.

LONDON, UNRRA European Regional Office, Division of Operational Analysis. Operational Analysis Pap. No. 18. **Economic rehabilitation in Finland.** 1947. pp. 41. [Mimeographed]

———— Operational Analysis Pap. No. 19. **Agriculture and food in Greece.** 1947. pp. 46. [Mimeographed]

———— Operational Analysis Pap. No. 23. **Agriculture and food in Jugoslavia.** 1947. pp. 57. [Mimeographed]

———— Operational Analysis Pap. No. 41. **The food situation in continental Europe.** 1947. pp. 92. [Mimeographed] **6**

These four mimeographed publications (for restricted circulation) contain detailed reviews of the position at the time in the countries concerned as regards land utilization, the economics of agricultural production, and the general food problems. —R.O.W.

HIRVENSALO, U. E. Angående fosfatgödslingens betydelse vid kärrtorvmarksodling i belysning av ett på Leteensuo försöksstation utfört försök. [**The importance of phosphatic manuring in the cultivation of fen peat soil in the light of an experiment conducted at Leteensuo Experiment Station (Finland).**] *Finska MosskFören. Årsb.* **51.** 23-4. 1947. **7**

The experimental area was cleared for cultivation in 1921 and clay at the rate of 200 m.^{3} per ha. was applied in 1923. The application of P_2O_5 at the rate of 0, 20, 40 and 60 kg. per ha. was tested with various crops.

The results showed that on fen peat soil in good heart even when clay has been applied yields are small unless artificial fertilizers are used. Potash manuring alone or any other one-sided manuring does not increase yields to an appreciable extent. Twenty kg. P_2O_5 per ha. together with potash manuring has increased the yield in a remarkable degree. With this smallest quantity of P_2O_5 used in the trial the increase in yield has been relatively greater than when quantities twice and three times as large have been applied.

On clayed fen peat soil in good heart an application of 20 kg. P_2O_5 appears to be able to maintain the yields at a satisfactory level provided that P_2O_5 manuring is carried out regularly each year. Phosphoric acid manuring appears during the first year of the trial not to have affected the thousand-grain weight of cereal crops, but when the supplies of natural, soluble phosphoric acid have been exhausted, the thousand-grain weight has shown a regular increase up to and including the heaviest application of P_2O_5. With oats and wheat phosphatic manuring has increased the straw yield in a relatively higher degree than the grain yield. With barley the opposite has been the case.—R.P.J.

VALLE, O. Kasvinviljelyksemme sodanjälkeinen tuotantosuunta. [**The direction of post-war crop husbandry.**] *Maatalous.* 1947. No. 1. 6-9. [Prof., Cent. Agric. Exp. Sta., Tikkurila, Finland] **8**

Finland lost 280,000 ha. of arable land in the war. For this reason and because of colonization and the lowered fertility of the land, the figure for the total harvest in 1946 reached a minimum, being only about 60 per cent of the pre-war figure.

After that date prospects improved considerably. Of decisive importance is the increasing use of fertilizers. During the war and after, the most serious deficiency was that of phosphoric acid. In 1948, 32 kg. P_2O_5 per ha. were being applied, or a quantity 2.5 times as great as that used before the war (1936-39). The use of potassium also has greatly increased. Supplies of nitrogen alone have not been abundant.

From 1939 to 1946 a considerable change has taken place in the composition of the bread cereal crops, the winter wheat area having diminished by 51 per cent and the rye area by 32 per cent, while the spring wheat area has increased by 22 per cent. This great decline in the growing of winter wheat is largely due to the many severe winters experienced from 1940 onwards. Spring wheat will assume an increasingly important position in the future, for in the period 1921-45, for example, it gave a yield approximately 8 per cent higher than that of the biennial rye. The weather from 1930 onwards has been very favourable for spring wheat in Finland, no cold summers having been experienced.

In 1946 the yield of fodder cereals (oats, barley, mixtures) was 50 per cent lower than in 1939. A noteworthy feature is the sowing of legumes in mixtures with cereals in order to increase the protein content of the indigenous fodder cereals. More importance will be attached to potatoes in the future, for this crop gives very high and reliable yields under Finnish conditions.—O.V.

VALLE, O. Kasvinviljelyksemme kehitysvaiheista tämän vuosisadan aikana. [**A half a century of crop husbandry in Finland.**] *Maatalous* 1947 No. 10-11. 153-6. [Prof., Cent. Agric. Exp. Sta., Tikkurila, Finland] **9**

The article contains statistical information on the areas occupied by the different crop plants in Finland in 1901, 1910, 1920, 1930, 1939 and 1946. The arable land, which was 1.6 million ha. in 1901, was 2.4 million ha. in 1946. A considerable change has taken place in the growing of bread cereals, for the rye area has been reduced from 18.2 per cent to 6.2 per cent, while the wheat area has risen from 0.2 per cent to 6.7 per cent. Fallow, which amounted to 18.5 per cent in 1901, had fallen to 6.2 per cent in 1946. The fallow was usually converted into autumn rye, but in the 1920's and '30's rye was also grown after herbage leys. The ley area arose in the 50 years from 32 to 55 per cent of the arable land, and the level of productivity of the temporary leys is a decisive factor affecting the whole development of crop husbandry in Finland.—O.V.

TOMLINSON, G. E. "**Bonifica**" **in Italy.** *Reclam. Era* **34.** 149-52 and 156. 1948. **10**

A brief account of a six weeks survey conducted by the technical mission of the U.S.D.A. to study the possibilities of further development of irrigation and agricultural and hydroelectric resources in Southern Italy, Sicily and Sardinia. Observations are made on the many interrelated problems which need to be solved before definite conclusions can be drawn on land reclamation.—P.M.

UNRRA, Agricultural Rehabilitation Division. **Greece. 1. Ripe for improvement. A study of marginal land farming in Greece. A survey of the agricultural resources of the Vouraikos river watershed with recommendation for improvement. 2. Greece. Improve the land,—the only hope [Photographic supplement to 1.]** By *F. G. Renner.* 1946. pp. 53. 1 map. **11**

This special study arose out of discussions early in 1945 between the Greek Minister of Agriculture and officials of UNRRA, from which it was concluded that help was needed in finding ways to remove some of the basic causes of low agricultural production and resulting poverty among rural people. It was decided that a group of technicians should undertake the co-ordinated study of a representative area, and the Vouraikos watershed or catchment area was selected as most characteristic as far as the complex of problems most frequently encountered in the thickly populated mountain areas are concerned.

The net result of primitive methods of cultivation, cultivation of steep slopes, widespread erosion and low crop yields, and excessive numbers of live stock is a semi-starvation diet for 1600 families. The study group have recommended improved methods of land use and crop and animal husbandry which they consider are essential for the rehabilitation of this area, so characteristic of Greece, and for that matter of countries in the Mediterranean environment as a whole.—R.O.W.

GOOR, A. Y. **Sand dune fixation in Palestine.** *Palestine Dept. Forests Ann. Rep.* 1947. pp. 8. **12**

The standard technique used in Palestine was that successful planting depended on the prior fixation of the area with sand-binding grasses and shrubs. A new technique has now been developed which seems to render the standard method unnecessary. When large plants (80 cm.-120 cm.) were planted with 40-60 cm. in the sand and about 40 cm. above ground the normal movement of the sand was never great enough to cover the plant or to blow the sand from under it.

" Plants are transported in their pots from the nursery by camels or by tractor-pulled rubber-wheeled trucks. On the site, the pots are removed the roots opened out and moistened and the plants delivered to the planting squad. This planting squad has meanwhile opened pits 80 cm. square and 80 cm. deep. The spacing is usually 2.5 by 2.5 m. giving about 150 plants to the dunam. The planting squad, having received its plants, then excavates a small hole, perhaps 20 cm. deep, in the bottom of the pit. This receives the ball of roots, and the rest of the plant is thus left with some 40 cm. above the sand. Each pit, after planting, is left as a slight depression in the sand, with the plant in its centre."

By this method the moistened roots are in the moist layer of sand, it requires at least the removal of 60 cm. of sand before the roots are uncovered, and the shallow depression which is left after the pit is filled in encourages the deposition of sand since there is a drop in wind velocity which implies less danger of adrasion of the stem by moving sand.

Acacis cyanophylla is the most important species of trees now used in sand dune afforestation. *Tamarix pseudo-pallasi* and *Tarticulata* are also used.—G.M.H.

MARASSI, A. La degradazione dei terreni nei paesi tropicali 1. [**Soil deterioration in the tropical countries. 1.**] *Riv. Agric. subtrop. e trop.* **42.** 7-19. [English summary, p. 19] 1948. **13**

The author deals with the problem of soil deterioration and erosion in tropical and subtropical countries. In this first part of the article, after referring to the present conditions of some regions of ancient civilization, he attempts to demonstrate that erosion is consequential of soil deterioration which is almost always caused by man, as when he destroys forests for growing crops or makes an irrational use of pastures. Considering that soil deterioration, in most cases, starts with the destruction of natural vegetation and particularly of the primary forest, he describes the transformations that take place in the forms, otherwise stable, of the natural vegetation and in the structure and composition of the soil in consequence of human action.—(From authors' summary).

GORRIE, R. M. **Soil and water conservation in the Punjab. With a foreword by Sir Evan M. Jenkins.** 26 × 18. pp. 298. Simla: 1946. **14**

This manual attempts to lay down the details of practical field work in the various phases of afforestation of catchments, reclamation of torrent beds and waste land, and the control of run-off from cultivation. In order to show the relationship of erosion control with flood-reduction, a detailed analysis has been made of erosional processes by water and wind as occurring in the Punjab, and the extent to which both are responsible for the destruction of cultivable land and for loss of fertility in land still under cultivation. The steps by which these processes of destruction and desiccation can be reversed are detailed, emphasising water conservation as an essential step in the fuller use of the land.—Summary.

HOPPER, W. C. **Australian agriculture.** *Agric. Inst. Rev.* **3.** 291-300. 1948. **15**

The importance of agriculture in Australia is reflected in the fact that nearly 40 per cent of the value of the production of all Australian commodities originates on farms and livestock properties. One-half of the total area of the continent is in pasture of various kinds, the great part never having been cultivated ; of this area the greater part is sheep pasture. The carrying capacity of such land varies from 3 sheep per acre to 15 acres per sheep. The development of the wool industry is due largely to the suitability of the perennial grasses found over large areas and in dry years, the foliage of bushes such as saltbush and mulga. The feeding, management and breeding of Merino sheep, which constitute about 70 per cent of the sheep in the country, has reached a high degree of perfection. About one million pounds of wool were produced during the year ending June 30, 1947, of which 90 per cent was exported, representing some 50 per cent of the total value of all Australian exports.

In 1947, some 14,600,000 acres of wheat were sown which were estimated to yield 228,000,000 bu.

This is a record production as the average annual production is about 129,000,000 bu. Spring varieties are generally grown, although sowing is carried out in the autumn (April and May) and harvesting between November and January. In general the wheats are lower in protein content than Canadian spring wheat. Of the annual production, about 70 to 80,000,000 bu. are used in the country, the remainder being exported. Although the 1947-48 crop of barley and oats were record crops (20,000,000 bu. and 40,000,000 bu. respectively), compared with Canada, production is relatively small. The greater part of the barley production goes for malting and a lesser amount is used as pig feed.

Dairy products rate third after wool and wheat in the national income from agricultural commodities. Barns for hay storage and stables in which to feed cattle are almost completely absent, as cattle can be pastured all the year round. Hay is mostly cereal hay and is stored mainly in stacks. Generally dairy herds are confined to the coastal regions where the rainfall is comparatively abundant. It is in these regions too that Australia's pigs are located.

The greatest limiting factor to agricultural production is the inadequacy of moisture. The average annual rainfall and rainfall reliability decreases with increasing distance from the coast. Most of the rivers are in the high rainfall areas, flowing from the low mountain ranges, relatively close to the coast, to the ocean.

Shortage of labour for rural industries, shortage of farm machinery and spare parts and a prevalence of industrial strikes which hold up agricultural supplies, are other factors instrumental in limiting agricultural production.—P.M.

SIMS, H. J. **Wind erosion control. Comments on methods used in the Walpeup district.** *J. Dep. Agric. Vict.* **46.** 241-8. 1948. **16**

The various methods of soil erosion control that have been undertaken by farmers in the Walpeup district are described. They include the non-burning of stubbles, the use of cover crops, the sowing of ryecorn on hills, channels and other vulnerable points, adjusting cultivation according to soil types and various crop rotations.—G.M.H.

BROWN, L. A. **Reclamation in Japan.** *Reclam. Era.* **34.** 106-7. 1948. **17**

With the help of American technicians, Japan is embarking on an extensive land development programme. It is intended to increase the food supply by 30 per cent by land improvement and reclamation. Irrigation and drainage are to be improved on over 5,000,000 acres; 700,000 acres will come under new irrigation schemes and over 3,000,000 acres of forest and grassland are to be brought under cultivation without irrigation. The irrigation development is for the purpose of producing paddy rice, since normal precipitation is adequate for production of other crops.

A unique, though common to northern Japan, part of the programme, consists of water warming projects. Water is warmed by containing it in shallow basins exposed to the sun. This water is used in paddy fields. Small reservoirs suffice for warming, but in other projects the water is conducted slowly through a network of broad shallow canals to the paddies.

Over 200,000 acres of shallow water areas near river deltas are to be converted to farm land. Although costs are high, it adds to the most fertile farmland in the country.

Drainage, flood protection and irrigation in delta areas of the larger rivers are also included in the reclamation plan.—P.M.

UNITED STATES, Department of Agriculture, Forest Service. Misc. Pub. No. 648. **The anthracite forest region. A problem area.** By *F. A. Ineson* and *M. J. Ferree.* 1948. pp. 79. **18**

Primarily a forestry publication reviewing the present forest situation, and indicating a programme for immediate and long-range action, in a region where 60 per cent is in forest, and the remainder in crop lands, pastures and the waste land due to mining operations.—R.O.W.

PENNSYLVANIA Agricultural Experiment Station. Bull. 497. **Soil erosion.** By *N. F. Farris.* 1948. pp. 17. **19**

Soil and water losses were determined, by weighing run-off, on experimental field plots after each rainfall producing run-off. Rainfall intensity and seasonal distribution proved to be much more important factors than total precipitation. Soil losses were about 50,000 lb. per acre from continuous maize plots in July and Sept. when rainfall exceeded 0.25 in. per hr. On rotation plots soil and water losses were maximum from maize in August and Sept. when growth was complete; for oats and wheat water loss was maximum in March and soil loss in May when cover was small; under clover-hay water loss was greatest in spring, and soil losses serious only during sward establishment in August-Oct. Run-off and soil losses were maximum on bare fallow plots. Control measures are increased use of grass and legumes in the rotation, contour strip cropping and contour cultivation and use of fertilizers to ensure heavy cover. See *Field Crop Abstr.* I. Abst. 947.—K.J.S.

WASHINGTON, Food and Agriculture Organization of the United Nations. F.A.O. Agric. Stud. No. 4. **Soil conservation. An international study.** 1948. pp. 189. 1 map. **20**

This study by the Food and Agriculture Organization of the United Nations (FAO) is a brief account of soil deterioration and some of the measures being taken in various countries of the world to correct the misuse of land. Particular emphasis is placed upon soil erosion and the conservation of soil through control of erosion, as one means of increasing and safeguarding the land resources of the world.—From Introduction.

FARMING SYSTEMS

YOUNG, J. A. **Farming in the United Kingdom.** *Agriculture, Québec* **5.** 77-86. and 189-97. 1948. **21**

This article presents general information of interest to the Canadian readers.—E.B.

MOORE, H. I. **Background to Yorkshire farming.** *J. Min. Agric.* **55.** 142-7. 1948. **22**

Yorkshire contains more than one-ninth of the agricultural land of England and is an area diverse in soil, climate and farming systems. "Corn is king in the East Riding; in the North Riding there is rather less arable and more permanent grass; in the West Riding the large number of cows and heifers in milk calls for food which give milk such as grass and oats." An account is given of the rearing farms of the west and of dairy farming, arable farming and market gardening as carried out in the county.—G.M.H.

GATENBY, W. W. **Wold farming in East Yorkshire.** *J. Min. Agric.* **55.** 151-4. 1948. [N.A.A.S., York and Lancs. Prov.] **23**

An account is given of farming on the 300,000 acres of rolling uplands (the wolds) of East Yorkshire. Farms on the average are large, often 500 acres or more, and sheep and cereals are the main source of income.—G.M.H.

GIBBONS, J., and FITTON, A. H. **Warpland farming.** *J. Min. Agric.* **55.** 155-7. 1948. **24**

There are considerable areas of warp soil in the region of the lower reaches of the Yorkshire Ouse. This soil of "alluvial material deposited from muddy water brought to rest" is farmed only in the case of certain tidal rivers. Artificial warping is possible but is not generally practised at the present time. The potato crop is of major importance in the farming systems on the warp, but wheat is another important crop. Strong strawed varieties (Victor, Jubilégem, Hybrid 27 and Bersée) are grown to stand up to the residues of the heavy dressings of fertilizer given to the potato crop.—G.M.H.

TJALLEMA, H. T. Mogelijkheden ter verbetering van het bedrijfsresultaat op de gemengde zandbedrijven. [**Possibilities of improving results on the mixed farms of the sand areas.**] *Maandbl. LandbVoorlDnst* **5.** 390-9. 1948. [Director of Crop and Pasture Husbandry, Netherlands] **25**

Farming in the light, sandy lands of the Netherlands is mostly mixed farming, in the hands of small farmers, and attended by many difficulties economic and environmental. The 9th issue for 1948 of the journal of the Netherlands Agricultural Information Service is devoted to the problems of these lands, and the present article is a general discussion of the subject. Heavier stocking, especially with dairy cows, a high percentage of arable land having temporary leys, some mechanization, pig and poultry keeping and the growing of various cash crops are included among solutions suggested.—G.M.R.

BARI, Agricultural Experiment Station. Esperienze di rotazione e di concimazione nell' azienda sperimentale di Foggia. [**Rotation and manuring trials on the Foggia experiment farm.**] By *G. Potenza.* 1947. pp. 32. **26**

Results of trials carried out between 1926 and 1935 are reported. These trials concern, dry-irrigated rotation (winter-spring cereals or bean in dry farming and summer-irrigated forage crops), dry rotation, manuring of wheat, nitrogen manuring of oats, and manuring of winter leys.—E.B.

GEORGIA Agricultural Experiment Station. Bull. 257. **Effects of cropping systems on yields and the nitrogen and organic carbon in the soil.** By *K. T. Holley, S. V. Stacy, R. P. Bledsoe, T. S. Boggess* and *W. L. Brown.* 1948. pp. 20. **27**

Nitrogen and carbon determinations on soil of continuous cropping and rotation field plots established in 1930 are recorded for the years 1936 to 1940, with crop yield data from 1934 to 1946. The results are not precise but they show a slight increase in total nitrogen, attributed to fertilizer dressings, and a slight decrease or no change in organic carbon content of the plots. Disappearance of organic matter appeared to be lowest in June. Continuous cotton (manured) yielded as well as cotton in rotation but maize was more successful in rotation (yield 28 bu.) than continuous (21 bu.). Continuous oats were weedy and less productive than in rotation. Liming benefited all crops.—K.J.S.

UNITED STATES Department of Agriculture. Fmrs' Bull. No. 1997. **Stubble-mulch farming to hold soil and water.** By *F. L. Duley* and *J. C. Russel.* 1948. pp. 32. **28**

The farming systems whereby crop residues are used to conserve soil and water are described. All dead residue must be left on the soil surface and to achieve this all tillage must be done beneath the surface. New methods of tillage are required for this system of farming and methods developed at the Nebraska Agricultural Experiment Station are described.—P.M.

MOSHER, M. L. **Relation of size of corn-belt farms to efficiency of production, soil conservation, farm population, amounts of products produced and value of products sold.** *Illinois Fm Econ.* No. 155. pp. 658-63. 1948. **29**

This study involved records of 170 farms for the ten years 1936-45. The results tended to support previous investigations of this nature. The smaller farms kept more of their tillable land in soil-building legumes and less in corn than the larger ones. Yields of corn did not show any significant change with changes in farm size, but labour and machinery costs per crop acre declined with increases in farm size. The greatest production of crops, considering grain, silage hay, pasture and some miscellaneous crops was on farms of under rather than over 260 acres.—T.G.J.

CROPS AND CROP PRODUCTION

VALLE, O. Uusia viljelyskasveja maamme oloissa. [**New crop plants for Finland.**] *Maatalous ja koetoiminta* **1.** 152-62. 1946. [Prof., Cent. Agric. Exp. Sta., Tikkurila, Finland] **30**

During the war the Department of Crop Husbandry of the Central Agricultural Experiment Station, Finland, conducted experiments in the growing of new crop plants, principally oil plants, condiments, and medicinal plants. Of the oil plants tested, the most reliable was oil flax (*Linum usitatissimum*), and this became the most widely distributed. A new Finnish bred strain, Ti 0774, was of special interest, ripening 10 days earlier than the Argentine variety.—O.V.

VALLE, O. Kasvintuotantomme kehittämistoimenpiteistä lähivuosina. [**Measures for the development of crop husbandry in the coming years.**] *Maatalous ja koetoiminta* **3.** 21-30. 1948 [Prof., Cent. Agric. Exp. Sta., Tikkurila, Finland] **31**

In 1920, plant production in Finland amounted to 1729 million food units, but rose during the next 20 years to 3670 million. The second world war caused a reduction of 287,000 ha. of the arable land, and as the yields per ha. also fell by about 30 per cent from 1940 onwards, plant production in 1946 amounted to 2280 million food units only, a production 39 per cent lower than the pre-war. Before the war Finland produced approximately 90 per cent of her requirements in food at home. Since the war the importing of food stuffs has been considerable.

By means of improved manuring and cultural technique it is possible to increase crop yields in the different regions. Rye has been the principal bread cereal, but the wheat area has greatly increased, mainly for the growing of spring-sown wheat. Spring wheat has proved to be a very reliable cereal crop under Finnish conditions. The most valuable variety hitherto has been the Svalöf strain Diamond I. Recent field trials have shown Kärn II from Weibullsholm, Sweden, to be a very productive new bred strain.

Oats have been and still are the most important fodder cereal. Before the war the area occupied by oats was about 18 per cent of the arable land. On account of the comparatively low protein content of oats, efforts are being made to encourage the growing of mixtures in the form of legumes with cereals. Three different mixtures have been recommended: peas and oats, vetch and oats, and multiple mixtures. Peas and oats can be grown as far north as 64°, but vetch and oats, because of the late ripening of the vetch, only in the south of Finland. A multiple mixture which has been used is composed of oats, barley, spring wheat, peas and vetch, each component in a proportion of 20 per cent. The protein content of fodder crops can be increased through an increasing use of mixtures rich in legumes.

Much research and experimental work has been devoted to the encouragement of potato cultivation. By various means potato yields have been increased very considerably. As root crops give relatively poor yields in Finland, it is of importance to extend the growing of potatoes so that they may be used for animal feed also.—O.V.

WAGENINGEN, Centraal Instituut voor Landbouwkundig Onderzoek. Lijst van de in 1944 door de Rijkslandbouwconsulenten en andere instanties genomen veldproeven. [**List of the field trials conducted by the Netherlands Agricultural Advisers and by different institutes and organizations in 1944.**] *LandbVoorlDnst Med.* No. 38. 1944. pp. 76. **32**

WAGENINGEN, Centraal Instituut voor Landbouwkundig Onderzoek. Lijst van de in 1945 en 1946 door de Rijkslandbouwconsulenten en andere instanties genomen veldproeven. [**List of the field trials conducted by the Netherlands Agricultural Advisers and by different institutes and organizations in 1945 and 1946.**] *LandbVoorlDnst Med.* No. 44. 1946. pp. 100. **33**

WAGENINGEN, Centraal Instituut voor Landbouwkundig Onderzoek. Lijst van de in 1947 door de Rijkslandbouwconsulenten en andere instanties genomen veldproeven. [**List of the field trials conducted by the Netherlands Agricultural Advisers and by different institutes and organizations in 1947.**] *LandbVoorlDnst Med.* No. 51. 1947. pp. 92. **34**

Of the trials outlined in this, the tenth List to be published, 2417 are under the supervision of the regional Agricultural Advisers and 451 under that of various Government and private institutes, foundations and organizations. As in previous Lists, the matter is arranged regionally under the main heads arable land and grassland, and again subdivided under manurial trials, varietal trials, and experiments in cultural technique. Locality, soil type, size and number of plots, and treatments are clearly indicated for each experiment.

The field crops concerned are autumn-sown and spring-sown cereals (rye, wheat, barley, oats, maize); grain legumes; fibre plants, especially flax; oil plants, especially poppy; caraway; potatoes; fodder beet or mangels; lupins; and various "stubble crop" or catch crop plants including different turnip varieties, vetch, crimson clover, *Phacelia* (the three last-named for green manure or soiling), and lupins and *Phacelia* for sandy lands.—G.M.R.

VEENSTRA, G. De ontwikkeling van het landbouwproefveldwezen in de province Overijsel van 1896 tot 1942. [**The development of field experimental work in the province of Overyssel from 1896 to 1942.**] *LandbVoorlDnst Med.* No. 45. 1946. pp. 93. [Director Agric. School, Meppel, and Director Primary Agric. Education in West Overyssel and the North-East Polder, Netherlands] **35**

A well-arranged historical review is presented. In addition to grassland trials, experiments have consisted of varietal trials of rye, vetch, potatoes, mangels, and other field crops, and of manurial trials. During the war the provision of fodder on arable land claimed more attention than formerly. Turnips were found to furnish a better yield of dry matter and protein than most other forage crops, and cultivation was cheap. Marrow stem kale came a close second, but required more labour.—G.M.R.

ANNALES AGRONOMIQUES. Recherches sur la fertilisation effectuées en 1947 par les stations agronomiques. [**Researches on fertilization carried out in 1947 by the agronomy stations.**] *Ann. agron. Paris* 18. 304-84. 1948. **36**

This begins with a record of climatological observations at Versailles and of soils at other stations. There are also short reports, by various authors, on the effects of fertilizers on the chemical composition, growth and yield of several crops which include wheat, sunflower, beet, grasses and legumes.—D.B.

CAMPOVASCO, J. Geografia de los grandes grupos de cultivos españoles. Plantas industriales. [**Geography of the major groups of Spanish crops. Industrial plants.**] *Surco* **7.** 3-6. 1948. **37**

Although there is a tendency to extend the cultivation of industrial plants in Spain, these at present occupy less than 2 per cent of the cultivated area, which is mostly devoted to cereals.

Sugar beet, the principal industrial plant, is grown on 54,000 ha. of land, mostly irrigated, which are situated all over the country but mostly in the plains of the Ebro and its tributaries, Lerida, the eastern part of Andalusia, and in the plains of the Douro and Tagus. Production of roots is 10.8 millions of metric quintals per year, with a sugar content of 13 per cent.

Peanut cultivation, of certain importance in the eastern provinces, covers 6000 ha. of irrigated land with a production of 100,000 metric quintals.

Development of fibre crops is foreseen mainly in the new irrigated areas; for these crops data of the period 1939-43 are given: flax: 5,900 ha. with a production of 36,000 metric quintals of fibre in Etremadura, Leon, Catalonia, Arragon, Rioja and Old Castile; cotton: 28,000 ha. with a production of 90,500 metric quintals of fibre in Etremadura, Arragon, Andalusia, Carthagena and Valencia; hemp: 6,500 ha. with a production of 20,000 metric quintals of fibre in the eastern provinces, Catalonia, Arragon and New Castile; esparto: 560,000 ha. with a production of 64,000 metric quintals of fibre in the south-east quadrant, Toledo and Saragossa.—E.B.

PANTANELLI, E. Problemi biologici nell' incremento delle colture meridionali. [**Biological problems in crop increase in South Italy.**] *Ital. agric.* **85.** 367-85. 1948. **38**

At the meeting of Southern Agriculture held at Portici (Naples) from 13th to 15th March, 1948, the author presented this report in which field and pasture crops of South Italy are reviewed in view of the possibilities of their increase.—E.B.

ZANINI, E. Necessità economico-sociali della colonizzazione e forme di attuazione in Sicilia. [**Economic and social needs of colonization and ways of carrying it out in Sicily.**] *G. Sci. nat. econ. Palermo* **44.** Sez. 3. pp. 21. 1947. **39**

The land of Sicily is to a large extent in large estates kept under extensive agriculture. It is estimated that they cover over one million ha., over one-half of this area being constituted of estates of more than 100 ha. In this region, land reclamation (which includes hydraulic regulations and agricultural reclamation), transformation of land property, and colonization (establishment of small farms) must integrate one with the other to the same ultimate end of increasing agricultural production.

A review of the situation is presented, with special consideration given to the intervention of the State to reach a solution in these problems.—E.B.

Leonard, W. H. **Principal field crops of Japan.** *Foreign Agric.* **12.** 174-80. 1948 **40**

Agriculture is the only industry in Japan which has not been seriously impaired by the war. Approximately 50 per cent of the national industrial capital is invested in it and about 47 per cent of the population is actively engaged in it. The five principal field crops are rice, barley, wheat, sweet potatoes, and potatoes. The following table indicates the relative acreage and production of these crops.

Area and production of the major food crops for the 5-year period 1941-45.

Crop	Average 1941-45		
	Average	Production	Yield per acre
	1,000 acres	1,000 bushels	bushels
Rice, rough	7,575.6	510,355.2	67.4
Wheat	1,992.0	46,505.8	23.3
Naked barley	1,202.3	31,113.1	25.9
Covered barley	964.7	31,345.5	32.5
Sweet potatoes	861.3	173,797.6	201.8
Potatoes (white or Irish)	478.6	73,200.6	152.9

Information is given on the types of each crop grown, methods of cultivation and some of the more important diseases and pests which affect the various crops.

The most practical immediate means of increasing production is the provision of more nitrogenous, phosphatic and potassic fertilizers. Adequate preservation of perishable food crops would also help in providing more indigenous food for the people.—P.M.

ECONOMICS OF CROP PRODUCTION

Edinburgh and East of Scotland College of Agriculture (Department of Economics). Bull. No. 14. **Report on financial results of 153 East of Scotland farms for 1946-7 comprising Group III. 37 stock raising and feeding farms. Group IV. 75 arable farms. Group V. 41 dairy farms.** By *D. M. R. Leask*. 1948. pp. 28. [Mimeographed] **41**

Group III.

The net output of cash crops was as high as 48 per cent of the total net output on these farms in 1946-47. The crops were mainly potatoes, barley and oats. Almost exactly one-third of the total area was under arable crops, including hay; of the remainder rather more than one-half was rotation or permanent grass, and the balance was mountain or heath-land. The lambs produced for sale in winter or spring were generally fed on the rest break. Oats were by far the most important arable crop, occupying an area almost equal to the combined total of the other root and grain crops.

Group IV.

Grain crops and potatoes were the mainstay of the economy of these farms, live stock being of secondary importance. The intensive sales crop production was only a little relaxed from that in 1944, but there has been an increase in the area under grass. The net output of crops was 73 per cent of the total output in 1946-7 barley amounting to 20.5 per cent and main crop potatoes to 27 per cent.

Group V.

The cropping of these farms reveals that the acreage under corn and roots has been fairly well maintained. The net output of crops was 32.5 per cent of the total net output of the farms. The area of land under rotation and permanent grass has gradually increased from 1944 onwards. Oats were the most important grain crop, and although large quantities were consumed on these farms, they provided the largest cash return of the grain crops. Potatoes provided a very considerable proportion of the income from crops whilst there was a small return from sugar beet grown on the most intensively arable farms.—T.G.J.

Manchester University Faculty of Economic and Social Studies. Agricultural Economics Department. Bull. No. 44/EC20. **Costs of feeding sheep on arable land. 1947-1948 crop.** 1948. pp. 7. [Mimeographed] **42**

Forage crops covering 268.5 acres were costed on 17 farms, mixed crops and rye accounting for 187 acres. The net cost per acre of the 239 acres of catch crops was £7 18s. 3d. and the corresponding figure for the 29.5 acres of main crops was £18 1s. 5d. The average cost per acre of 582.5 acres of beet tops was £3 18s. 7d., and the cost per sheep per week was 10d. compared with 1s. 4d. on the forage crops. The net farm profit was 10s. 10d per sheep, compared with a loss of 13s. 10d. in 1945-46. The net cost was £6 0s. 3d. the cost or valuation of the store lamb being £4 11s. 4d. and the cost of foods (including grazing) being £1 4s. 9d. —T.G.J.

Jones, T. G. **A study of a co-operative machinery group in South Wales.** 1948. pp. 11. [Mimeographed] **43**

The article reviews the work of a machinery group operated by an agricultural co-operative society in 1947. The main conclusions are that the scope for such work will be limited in Wales, at least, by geographical considerations as well as by the tillage acreage of the area in which the group operates. A comparison of receipts in 1947 with those of 1946 and 1945 shows that income from ploughing and disking was at its lowest in 1947. The weather influenced the amount of work done considerably; a particularly favourable August meant that the group was not called upon for corn harvesting to the extent it might have been in a wet harvest. The complement of machinery on farms has increased, so that the presence of the group has not led to any dependence on the organisation with a consequent saving to the farmers themselves.—T.G.J.

WYE COLLEGE (University of London), Department of Economics. Rep. No. 41. **Financial results on the College farms. XIV. Milk production over four years, 1943/4 to 1946/7.** By *J. Wyllie.* 1948. 101-25. **44**

The summary of the annual results reveals that costs of food per gallon increased from 11.16d. in 1943/4 to 14.06d. in 1946-7. Home-grown corn, hay and roots and grazing decreased from 10.68d. in the first year to 10.50d. in the last year, or in other words, purchased foods which amounted to only 1.4 cwt. of the 18.3 cwt. concentrates fed in 1943-4, amounted to 12.3 cwt. out of the total of 19.5 cwt. in 1946-7. At the same time it is pointed out that in 1946-7 a special effort was made to cater for the needs of the milking herd by grazing maize, cabbage, kale and turnips, whereas in the other three years more of these crops was grown. Two acres of maize cost a total of £83 16s. 10d., of which £75 1s. 10d. was chargeable to the cows, and although it was a bumper crop there is little doubt that it was a rather expensive foodstuff.

By reducing all foods to the starch equivalent basis it was found easier to compare the change in quantities of food fed and their cost on a sounder basis. It is shown that the high cost of feeding in 1946-47 was due to a consumption of 526 lb. S.E. per 100 gallons against only 364 lb. in 1945-6 and for this the very dry summer of 1947 must be held partly responsible.

The cost of food-stuffs per gallon is not due to any one factor, but to a very complex relationship between the quantity of food consumed, the composition of the ration fed at different times and the proper allocation of that ration to cows giving different quantities of milk, the cost of these foodstuffs and the average milk yield per cow. One important fact emerges, that cost of grazing and green meat per 100 gallons has decreased from 7s. 1d. in 1943-4 to 4s. 11d. in 1946-7. Net costs of food-stuffs amounted to 47.4 per cent of total costs over the four-year period.—T.G.J.

RAEBURN, J. R. **Notes on supplies and prices, 1947.** *Pig Breed. Gaz.* No. 54. pp. 6. 1947. **45**

The reduction of feeding-stuffs rations for pigs in 1946 was the principal cause of one of the most rapid curtailments of breeding ever recorded. Some increases have since been forthcoming, but the demands of the Minister of Agriculture cannot be met unless rations are further increased. The main reasons are that home production has not increased as was expected, and the low yield of 1947 crops in North America and Europe. Despite the promised freedom to retain up to 20 per cent of their 1948 crops of millable wheat and barley for feeding purposes, the greater part of the expansion of pig numbers will depend on imported feeding-stuffs. The commercial world is still so short of both bread and coarse grains that it cannot afford to use more as feeding-stuffs. Some assistance may be obtained from the proposed import of 500,000 tons of 'coarse grains' from USSR.—T.G.J.

RAEBURN, J. R. **Prices and costs. Changes brought about by the war.** *Fmr and Stk-Breed. Yearb.* 1948. **46**

The trend of Government policy relating to production during and after the war is outlined, concluding with the annual price review and negotiation. The shortages of feeding-stuffs and the need for more potatoes, wheat, sugar beet, etc. led to changed systems of production and increased costs. Taking 1927-8 to 1929-30 as base the index of prices of the main crops had fallen by 1938-9 and have risen almost consistently ever since. The biggest increases up to 1947-8 have been in the cases of potatoes and barley. By 1949-50 barley will have increased most in price, closely followed by wheat and potatoes.—T.G.J.

BEILBY, O. J. **The problems of marginal farms.** *J. Proc. agric. econ. Soc.* **7.** 306-20. 1948. **47**

In 1944 the Department of Agriculture for Scotland commenced an investigation into the problem of marginal farms, which were estimated to account for some 34 per cent of the total acreage of agricultural land in Scotland, for 44 per cent of the rough grazing and for 13 per cent of the crops and grass. Some 6890 farms were classified as marginal while a further 2820 originally considered as marginal, but found to be making a reasonable profit, were classified as "control" farms. The survey revealed the average size of farm as 263 acres, with crops and grass occupying 64 acres. Other cropping details were:—oats 16 acres, potatoes 3 acres, turnips 5 acres. On the control farms the average size was considerably larger, the area devoted to arable crops greater and yields were consistently higher. Purchases of lime and fertilizers revealed that the control farms were buying considerably more than the marginal farms. The acuteness of the labour problem was, in some cases, attributed to the proportionately greater acreage that farms of this type have been called upon to plough. The margin of cultivation has been moved a little higher up the hills. The inflexibility of farming systems on this type of land is indicated by the fact that farmers have been unable to take advantage of the relatively high prices fixed for crops in recent years. Cash cropping, apart from seed potatoes in certain areas, is of little importance. The low per acre yields of fodder crops and grass preclude any appreciable turnover of store stock. The author holds that the most promising line of advance in the provision of an adequate standard of living may well lie in the better management and utilization of grassland. —T.G.J.

SCOTLAND Department of Agriculture, Farm Economics Branch. **The agricultural output of Scotland.** *Fm Econ.* No. 15. 1948. pp. 2-7. **48**

The outstanding feature of the changes in the value of the physical production of Scottish agriculture between the years before the war and the present day are in respect of crops. In the period 1936/37-1938/39 the value of crops was £7,007,000 or 18.9 per cent of the total, by 1946-7 the value had risen to £20,625,000 or 25.8 per cent of the total. Barley accounted for 1.3 per cent of the output in the average pre-war period ; in 1946-7 it had increased to 3.0 per cent. Potatoes, including the important seed trade to England, are now the third most important item of output (they were fifth before the war). The inter-country transfers of seed oats and seed potatoes are estimated to represent 5.3 per cent of Scottish output, compared with an estimated 1.7 per cent before the war. The production and output (i.e. quantity sold off farms) of oats, taking the average of 1936-7 and 1938-9 as base, have increased to 123 and 153 respectively, for wheat the corresponding figures are 80 and 108, for barley 248 and 207, for potatoes 188 and 180 ; for sugar beet, production of which is equal to output, the increase has been 36. Despite these considerable increases, all the above figures with the exception of potatoes production, are below the figures for the plan year 1943-4. The index of value of output at constant (1946-7) prices reveals that over the period discussed the value of total output has increased to 105, the value of total crops to 155 and a decrease in the value of total live stock to 91. Between 1943-4 and 1946-7 there was a significant decline in the acreage under saleable crops.—T.G.J.

KIRK, J. H. **The output of British agriculture during the war.** *J. Proc. agric. econ. Soc.* **7.** 30-9. 1946. **49**

From the outbreak of war up to 1942-43 net output measured in food values increased 70 per cent. and measured in units of shipping space it increased 120 per cent. This increase is not only a measure of the efforts of farmers in the United Kingdom, but an indication of the success of the integrated food policy developed by the United Nations. This enabled us to concentrate on the production of food-stuffs like potatoes which are high in food values per acre or per man, or like feeding-stuffs, which are expensive of shipping space.

The factors which influenced food production policies are enumerated. It is shown how these factors e.g. output per acre, " protective " value, bulkiness etc. varied in importance with changes in the shipping position, available manpower, etc. From 1937-8 to 1943-4 the value of gross output increased from £300 millions to £622 millions. Field crops played the largest part in this increase, that is to say, £146 millions. Fruit, vegetables, etc. increased £74 millions. Imported feeding-stuffs declined from 8.75 million tons to 1.25 million tons. Of the 1.25 million tons almost all consists of the offals of wheat and oil seeds imported for other purposes. To offset this the compulsory ploughing orders were introduced. The ploughing of grassland may not have produced more than an extra 20 per cent measured in starch equivalent per acre but the indirect increase is probably greater in that it compels more intensive utilization of the remaining grassland, and equalises feeding-stuffs supplies throughout the year.—T.G.J.

OXFORD UNIVERSITY, Agricultural Economics Research Institute. **The £100 million expansion programme for agriculture.** *Westminster Bank Rev.* Nov. 1947. pp. 3. **50**

An attempt is made to assess the changes in cropping, stocking and other branches of our agriculture that will produce the output requested by the Government. Increased outputs of wheat, barley and oats, and smaller quantities of potatoes and sugar beet, compared with 1946-7, are called for. It is suggested that if machinery and spare parts are made available and provided farmers reduce the proportion of " cleaning " crops to the 1943 and 1944 levels, then the cropping target is attainable. Some 4,000,000 extra tons of imported feeding-stuffs will be required by 1951-2. Some farms may be unable to maintain their production of feeding-stuffs. Powers of direct control over cropping are not envisaged ; higher prices are the main inducement in the plan.

The following are the acreages suggested by the authors as likely to meet the demands of the Government :—

Acreages of Crops. United Kingdom.

	1947(*)	1951(†)
	thousand acres	
Wheat	2,168	2,630
Barley	2,062	2,250
Oats	3,328	3,350
Linseed	30	400
Potatoes	1,332	850
Sugar beet	395	400
Total	9,315	9,880
Other tillage crops and fallow	3,591	3,502
	12,906	13,382
Rotational grassland	5,673	5,230
Permanent grassland	12,375	12,400

*Preliminary.

†Estimated from programme as announced.

—T.G.J.

Reinikainen, A. S. Sadon arvioinnista lähinnä Suomen olosuhteissa vuosien 1941-1945 kokemusten perusteella. [**Crop yield estimates under Finnish conditions, according to experience in 1941-1945.**] *Acta agral. fenn.* **65.** 1-284. [German summary, pp. 281-4] 8 tables. 14 maps. 1946. [Inst. Agric. Econ., Univ. Helsinki, Finland] **51**

Crop yield estimating is very important and especially so under wartime conditions, when it is necessary to estimate the amount of the harvest while it is still growing. The author's study is based on the material collected from 1942 to 1945 by the so-called crop yield estimate boards in Finland. The estimates were made separately in all the Finnish districts (municipalities, parishes) for all the principal crop plants. The treatise includes maps showing the distribution in kg. per ha. of all the crops grown in Finland in 1942-45.—O.V.

Sipilä, M. Maatalouden työajan käyattö ja työntutkimus. [**Utilization of working hours and efficiency study in agriculture.**] *Acta agral. fenn.* **66.** 1-496. [English summary, pp. 491-6] 127 tables. 1946. **52**

The material for this study was collected from 60 farms in 1937 and 1938. Data are presented on the cost of labour in hours (man, horse, tractor), of growing different crops such as winter rye, winter wheat, spring wheat, barley, oats, peas, potatoes, roots, green fodder crops, linseed, and herbage leys. Detailed information is given on the amount of work entailed in ensilage by the A.I.V. process and in haymaking. There are English as well as Finnish headings to the tables.—O.V.

Levie, E. L. Graan versus zuivel. **Grain versus dairy products.** *Landbouwk. Tijdschr.* **60.** 273-83. [English summary, p. 283.] 1948. **53**

An attempt has been made to determine the economic pros and cons of ploughing up grassland in the Netherlands. The area suitable for either grassland or cereal production is approximately 500,000 acres. The following is calculated:

Utilization of 500,000 acres.

	Million guilders 1934/38 price level
Nett profit or loss cereal production	−2
Nett profit or loss dairying:	
Under normal grass farming	−30
Under intensive grass farming	−18
	1947 price level
Nett profit or loss cereal production	+48
Nett profit or loss dairying:	
Under normal grass farming	0
Under intensive grass farming	+125

—From author's summary.

Brizi, A. I problemi economici dell' agricoltura meridionale. [**The economic problems of agriculture in South Italy.**] *Ital. agric.* **85.** 427-47. 1948. **54**

In this report presented to the meeting of Southern Agriculture held at Portici (Naples) from 13th to 15th March, 1948, the author examines all the problems related to agriculture in South Italy.—E.B.

London, Royal Institute of International Affairs. **A food plan for India. With a foreword by A. V. Hill.** 1945. pp. 62. [Received 1948] **55**

It is expected that the population of India, which was approximately 400 millions in 1945 will have increased to about 450 millions by 1953. To feed this extra population, and at the same time to provide a 10 per cent increase in the average diet, it is estimated that a further 14 million tons of rice, wheat and other food grains will be needed. Among measures which could achieve this, the use of improved varieties of seed is given higher priority. The use of fertilizers, improvement of water supplies, control of seed-borne disease and of stored grain pests and malaria control are all means which collectively can assist in reaching the required production. Pulses and vegetables are considered necessary in any improved dietary, and provision is made in the plan for increased production of these. Control of prices is advocated to give the cultivator a mimimum return of about Rs 2 per maund of paddy on the field. Assuming a minimum increase in yield of 3 maunds per acre, this should enable the cost of fertiliser and seed to be met. The average expected increase is 7.5 maunds per acre, or 15 million tons of food grain from the 80 to 90 million acres considered, with a value of Rs 200 crores (£150 millions), the greater proportion of which would remain with the cultivator for consumption or sale and would stimulate enormously the purchase of consumer goods and a rise in the general standard of living. The need for a centralised plan has been realised and short- and long-term plans are being put into operation. Marginal land is being brought into cultivation and the proportion of land devoted to food crops is being increased. It is stressed that the 1943 famine was symptomatic of the highly critical state of affairs which has now been reached in India. Agricultural development is recognised to be the fundamental basis of a prosperous India; self-sufficiency in food supply is necessary to avoid disaster. To this end the raising of yields of rice and wheat, which in India are almost the lowest in the world, and an adjustment of the fall in the acreage per person devoted to food crops from 0.83 in 1911 to 0.67 in 1941, are essential.—T.G.J.

VIJAYARAGHAVACHARYA, T. Oxford pamphlets on Indian affairs No. 9. **The land and its problems.** 3rd edn 1945. pp. 32. **56**

From the point of view of world production and supply of materials for the world's industries, India is one of the foremost countries today, and it is not at all unlikely that it will in the not distant future occupy the first rank. It is one of the largest producers of cane sugar, rice, cotton, groundnut, linseed, jute, millets and tea. At present, the rate of increase of the population outstrips the means of subsistence. Uncultivated land is considered marginal, and it is possible that only state action could bring vast areas of malaria-infested jungle into cultivation.

Broadly, northern India is the home of the wheat, and southern and north-eastern India are the home of rice. About 80,000,000 acres are devoted to the latter crop and some 32,000,000 acres to wheat. This is partly due to the fact that rice flourishes however heavy the rainfall, and to the fact that land under rice seems to be able to manure itself provided the supply of water is adequate. Barley grain, mustard, rape-seed and linseed predominate in the north, while ragi, horse-gram, groundnut, castor seed and gingili take their place in the south. Oilcakes are an important cattle food all over India and are also available as manures. The cane cultivation on the Deccan canals in Bombay which produces yields as heavy as anything in Java, Cuba or the Hawaian island, owes its productiveness to the application of groundnut cake to the fields. Paradoxically, the northern provinces lying outside the tropics are responsible for 97 per cent of the total cane-production of India.

The broad effect of the physical and economic factors on the shape and pattern of Indian agriculture is traced, and the author reaches the conclusion that the most pressing need of India's rural economy is an influx of new techniques, achieved by technical education, and capital from state funds. —T.G.J.

ONTARIO Bureau of Statistics and Research, Department of the Provincial Treasurer. **A conspectus of the province of Ontario.** 25 × 17. pp. 430. Toronto: Baptist Johnston. 1947. **57**

This work constitutes the first survey of the economic affairs of the Province by any Provincial Government, and appears as the result of work carried out by the Ontario Bureau of Statistics and Research. The Bureau was set up in 1943 and one of the purposes for which it was established was "to create an organization capable of undertaking a scientific and practical analysis of the many and varied technical, financial and economic problems confronting a Provincial Government."

The work is in two sections, the first being descriptive analyses of the subjects, and the second, some 258 tables of statistical data. Eleven chapters in the first section deal with physiography, historical summary, constitution and government, population, natural resources and primary industries, construction industry, survey of production, retail trade, transportation communications and financial institutions.

It is interesting to note that agriculture is the leading primary industry in the Province and the value of Ontario's farm products occupy a prominent place in the Canadian total. Since 1910 the Province has had the highest figure for value of farm products, in the country, and it was 30 per cent of the Canadian total in 1940. Other sections on agriculture deal with yields, incomes, inventories, marketed products, prices, farm populations, rural taxation, farm living standards and other related subjects, and the findings of the Guelph Conference of 1941, relating to soil conservation are briefly set out.

This work contains a store of valuable information, for the layman as well as for the specialist and should be a pattern for similar work which may be instituted by other Provinces. A series of works of this nature, covering all the other Provinces of Canada would do much to promote a better understanding of the country not only by people of other countries, but by Canadians themselves.—P. Mackintosh.

MACHINERY AND EQUIPMENT

ACHTERSTRAAT, J., and RIEMSDIJK, J. F. van. De mogelijkheden van verdere mechanisatie van de gemengde zandbedrijven. [**Prospects for the further mechanization of the mixed farms of the sand areas.**] *Maandbl. LandbVoorl-Dnst* **5.** 399-411. 1948. [Agricultural Advisers, Arnhem and Zwolle, Netherlands] **58**

The mixed farms in the light lands of the Netherlands are mostly smallholdings, and on these the only way in which further mechanization will be profitable is through co-operative ownership of agricultural machinery.—G.M.R.

MCINTOSH, A. E. S. **The Standing Committee on Crop Investigations with special reference to investigations into mechanisation.** *Malay agric. J.* **31.** 5-11. 1948. **59**

Broadly, Malayan agriculture, from the point of view of mechanisation, may be divided into two classes: (1) agriculture on the wet padi or *sawah* areas, and (2) agriculture pursued under dry-land conditions. For each of these classes the choice of machinery is determined by (a) the conditions and (b) the operations considered best suited to giving optimum agricultural results. With regard to the *sawahs* the important factors are those which affect the physical ability of the land in question to support machinery. Generally, the conditions call for decreasing the weight of the machinery units on the land and yet at the same time increasing the grip of their wheels on tracks. Machinery requirements for dry-land in Malaya as a whole are essentially similar to those for dry-land agriculture elsewhere and choice for the varying conditions is largely referable to the operations considered most suitable for the soil type and crop type.—G.M.H.

MCINTOSH, A. E. S., and BERWICK, E. J. H. **The organisation for the collection and maintenance of agricultural machinery.** *Malay agric. J.* **31.** 12-9. 1948. **60**

The kinds of machinery, the numbers desired and the numbers already available in Malaya, together with the conditions and operations for which it is proposed to use each are given in tabular form.—G.M.H.

HARTLEY, C. W. S. **Notes on mechanical cultivation costs at the Central Experiment Station, Serdang.** *Malay. agric. J.* **31.** 57-63. 1948. **61**

Working costs are given for cultivations with disk and mould-board ploughs, disk-harrows and spring-tyne cultivators on flat valley quartzite soils, and sloping hill quartzite and Ramb series soils, using Fordson and "Caterpillar" D.4 and R.4 track-tractors. The difficulties experienced during cultivation and the relative value of different implements are also discussed.—G.M.H.

YU, J. Y. T. **Chinese agriculture and its mechanization.** *Agric. Engng* **29.** 297-8 and 300. 1948. **62**

After outlining the size of farming units, the labour situation and animal power, the author advances some suggested essentials of a tractor for Chinese farming. The tractor should have sufficient power to pull a plough of 10 to 12 inches; it should be able to handle light work like seeding and cultivating; should possess some convenient devices whereby the tractor can be changed to a hauling unit; ability to provide stationary power and moderate price, simple maintenance and easy operation. "Such a small tractor is believed to have its importance in mechanizing Chinese small farms, as well as in serving as a primary step while small farms are being reorganized into larger units."—P.M.

UNITED STATES Department of Agriculture. Misc. Publ. No. 630. **Progress of farm mechanization.** By *M. R. Cooper*, *G. T. Barton* and *A. P. Brodell.* 1947. pp. 101. **63**

"This publication keynotes the place of farm mechanization in the greatest of all farm production jobs, and analyzes the influences of mechanization on farm employment, on efficiencies in production, and on production costs and returns of agriculture."—Extract.

UNITED STATES Department of Agriculture. Fmrs' Bull. No. 1992. **Disk plows and their operation.** By *I. F. Reed.* 1948. pp. 10. **64**

With improved soil-management practices there have been changes in design which have enabled disk ploughs to be used increasingly. Comparisons of disk and moldboard ploughs are made and detailed and illustrated explanations are given of the standard and vertical disk ploughs. Notes are included on draft and penetration and care of equipment.—P.M.

AGRICULTURAL ENGINEERING. **Direct engine-driven power take-off.** By various authors. *Agric. Engng* **29.** 245-8 and 250. 1948. **65**

A comprehensive account of discussions presented at the winter meeting of the American Society of Agricultural Engineers, at Chicago in December, 1947. It is maintained that the latter paper reflects the thinking and conclusions of the other engineers participating in the discussion.—P.M.

SEEDS

Mali, L., Valle, O., Brummer, V., Mantere, M., and Sinisalo, J. Siemenviljelyn opas. [**Instructions in seed production.**] 21 × 15. pp. 200. Helsinki: Pellervo-Seura, 1948. **66**

This book was written in order to stimulate post-war seed production in Finland, and is based for the most part on the results of Finnish experiments and experience. L. Mali contributes sections dealing with general considerations, horticultural and ornamental plants, O. Valle the sections on clovers and grasses, pulse for fodder, and industrial plants, V. Brummer that on roots, M. Mantere and J. Sinisalo the sections on sugar beet and cereals respectively.

In the 1930's Finland imported a large part of her requirements in seed of fodder legumes (vetch and Peluschke peas), roots (swedes, turnips, mangels, fodder carrots, sugar beet), fibre plants (flax), many species of herbage plants (alsike), white clover, cocksfoot, meadow fescue, smooth-stalked meadow grass, red fescue, perennial ryegrass), as well as all seed of flowers and vegetables. The country was self-sufficient only in the seed of cereals (rye, winter wheat, spring wheat, oats and barley), peas, timothy, meadow foxtail, and red clover. The only seed exported was a limited amount of meadow foxtail and timothy.

The outbreak of the second world war caused great difficulty in obtaining supplies of seed, and various measures were adopted, therefore, to stimulate the production of seed at home. The result up to the present has been rather meagre, because during the war years and subsequently, farmers have not been much inclined to take up new branches of husbandry such as seed growing, to which a certain amount of risk is attached.

From 1940 onwards very considerable quantities of seed have been imported, the species concerned including timothy and red clover in addition to those mentioned above, and also seed of oil plants and spring cereals. The value of seed imports rose in 1947 to over 250 million Finnish marks (about £500,000). This book contains detailed information on the average amount of seed imported from 1940 to 1946 and in the year 1947.

The best climatic conditions for seed production are found in the south-west of Finland, as the growing season is longest there. It amounts to approximately 170 days, with average temperatures during the day of over 5°C. But in central Finland also there are good conditions for obtaining early-ripening seed crops, timothy in particular.

Two laws designed to promote the production of home-grown seed are in force. According to these the price of seed is based on the price of rye. The first law, promulgated in 1944, concerns fodder pulse (vetch, Peluschke peas), roots (swedes, turnips), flax and oil plants (linseed, rape, turnip rape, mustard and poppy), and will be in force till 1950; the second, passed in 1946, affects herbage plant seed (timothy, alsike, red clover, white clover, meadow fescue, cocksfoot, smooth stalked meadow grass, red fescue and perennial ryegrass) and is intended principally to assist the production of seed of Finnish bred strains, up to the present Tammisto strains (from the Tammisto Plant Breeding Station). This law will be in force until 1955.

The Finnish seed laws of 1919 and 1937 are strictly enforced. Each year a check is made of all the principal kinds of seed for the minimum requirements in germination capacity, purity, and weed content. Seed which does not fulfil the minimum requirement may not be offered for sale. The maximum weed content permissible for timothy grown in Finland is 1.5 per cent, for red clover 1 per cent, for alsike and white clover 1.5 per cent, and for spring cereals 0.2 per cent. The content of so-called noxious weeds may not amount even to these quantities in seed of herbage plants. Species included among the noxious weeds are *Barbarea vulgaris*, *Chrysanthemum leucanthemum*, *Matricaria inodora*, *Anthemis arvensis*, *Anthemis tinctoria*, *Cirsium arvense*, *Rumex domesticus* and *R. crispus*.

For cereals, three different classes of quality are recognized: commercial seed, high-grade seed, and élite seed. The commercial seed has to fulfil the minimum requirements. Only certain bred varieties are recognized as high-grade and élite seed, such as have distinguished themselves in varietal trials, at the most five or six varieties of the same species. The best, élite seed is inspected in the field for varietal purity and the presence of different diseases, especially smut. The high-grade seed is subjected to one laboratory test only, but the requirements are higher than those for ordinary commercial seed.

The parts of the book dealing with cultural technique contain instructions for growing seed of the principal crop plants. According to Finnish experiments and experience, it is technically possible to grow a fairly wide range of different seeds. There is very little technical possibility of producing fodder beet (mangel) seed profitably, as the growing season even in the south of Finland is short for this crop. On the other hand, the production of seed of the Cruciferae is very well possible. As the seed roots cannot winter in the ground they have to be stored in clamps, which increases the costs of production. Swede seed growing has been done in recent years by means of small seed roots, 100 to 150 grm. in weight. To obtain the seed roots, seed is sown fairly late, in the middle of June, at the rate of 3 kg. seed per ha. Some smaller experiments in growing the seed of sugar beet have been made, parallel with the breeding of that plant.

The pulse grown fodder in Finland consists of peas, Peluschke peas, and vetch. In pea seed the country has been self-sufficient. It was found in growing seed of Peluschke peas and vetch in the 1940's that Peluschke peas ripen very late, so that they can be grown only in the south-west of Finland. These peas are of importance for the production of green fodder. Vetch is very valuable both for green fodder and harvested ripe, for which reason the production of home-grown seed is of importance. For seed, vetch is grown in the south of Finland, alone or together with oats (for example, 80 kg. vetch + 80 kg. oats per ha.).

Flax is one of the most important industrial plants grown. The seed matures early, but it has been difficult to produce any large quantities for the seed trade as the Finnish cultures are very small. Oil flax (linseed) is the principal oil plant, and the seed of new Finnish varieties (Vaanila, Ti 0774) is being reproduced.

The book includes descriptions of the cereal varieties grown in Finland. The section on the production of flower and vegetable seed is based on foreign experience.—O. Valle.

NETHERLANDS, Ministry of Agriculture, Fisheries and Food. **The agriculture of the Netherlands. Dutch propagating stock for crop husbandry and animal husbandry.** 1947. pp. 28. **67**

This illustrated brochure in English includes an account of the inspection, certification, marketing and exporting of seed in the Netherlands, and of the organizations and regulations which ensure the production of good seed and protect breeder and purchaser alike.—G.M.R.

ROMANO, J. M. Ventajas de las semillas fiscalizadas. [**Advantages of certified seed.**] *Granos* **10.** Nos. 10, 11 and 12. 14-6. 1946. [Received 1948] **68**

A radio address, enumerating for the Argentine farmer the advantages of using certified seed, namely, lower seeding rate, uniform germination and development, freedom from weed seeds, and greater productivity.—G.M.R.

BRESAOLA, M. Per la produzione foraggera. Le sementi nella legge e nei metodi ufficiali di analisi. [**The law in relation to seed for forage production and official methods of analysis thereof.**] Suppl. to *Ann. Sper. Agr.* 2. pp. 19. 1948. **69**

A critical survey of regulations which at present rule seed trade in Italy and of the official methods of analysis is reported.

Proposals are made for each case in which experience and practice suggest modifications of the rules now enforced. [Abridged translation available.]—Author's summary.

WAGENINGEN, Rijkscommissie voor de Samenstelling der Rassenlijst voor Landbouwgewassen Drie en twintigste beschrijvende rassenlijst voor landbouwgewassen. [**Twenty-third descriptive list of varieties of field crops.**] 1948. pp. 255. **70**

A 16-page commentary in English is supplied with the list.—G.M.R.

BOLOGNA, Istituto di Allevamento vegetale per la Cerealicoltura. Appunti sul problema delle sementi [**Notes on the seed problem.**] By *M. Bonvicini. Ital. agric.* No. 5. pp. 7. 1946. **71**

A proposed scheme to organize seed production in Italy.—E.B.

COTTRELL, Helen J. **Tetrazolium salt as a seed germination indicator.** *Ann. appl. Biol.* **35.** 123-31. 1948. [May and Baker Ltd. Research Labs.] **72**

Two-hour soaking in a 1 per cent solution of 2 : 3 : 5 triphenyl tetrazolium chloride produced a good even stain in wheat and barley. Peas and vetches required a 2 per cent solution. Extension of the method to small seeds such as grass, and mustard, parsnip and turnip presents difficulties in observing the stain.

The test takes about 24 hr. compared with 10 days for the germination test. The technique is however tedious since some seeds, e.g. oats, have to be dissected before sectioning. Latent germination or lack of viability are detectable, making the method useful as a screenery test for cereals and the larger legumes.

An addendum contains certain American observations by Porter *et al.* on the range of usefulness and limitations of the test when applied to dicotyledons.—K.J.S.

STILES, I. E. **Relation of water to the germination of corn and cotton seeds.** *Plant Physiol.* **23.** 201-22. 1948. [Harris Teachers' Coll. St. Louis, 4, Missouri] **73**

The quantitative aspects of water absorption during germination were investigated to determine (1) whether seeds differ in total amount and rate of water intake ; (2) the part played by the seed coat, endosperm and cotyledons ; (3) the existence of mesic "hydric" or xeric germination adaptations ; and (4) whether there exist varietal differences in water absorption. These last existed in the three varieties of maize and the two varieties of cotton investigated.—D.B.

DISEASES, PESTS AND PARASITES

FREAR, D. E. H. **A catalogue of insecticides and fungicides. With a foreword by F. F. Lininger. Vol. 1. Chemical insecticides.** 27 × 20 pp.213. Waltham, Mass ; Chronica Botanica Co. 1947. $6.50. **74**

Investigators working with insecticides and fungicides will welcome the appearance of this work. Professor Frear has displayed great skill in the collection and arrangement of this catalogue of compounds tested or employed at various times for the control of insect pests. The work contains fitting references to original and review papers and to the patent literature.

The compounds are classified according to a code system, as an alphabetical arrangement would make no allowance for the chemical relationships involved. Each chemical compound has been given a code number, which is made up of numbers assigned to each constituent group occurring in the compound, the numbers in the groups being arranged in consecutive order beginning with the lowest. A knowledge of chemical terminology is an asset to users of this volume; for those who prefer to locate compounds by name an alphabetical list of the compounds is given at the end of Vol. II. This is unfortunate since insecticides and fungicides have been allocated separate volumes. Separate indexes would therefore have added to the value of this work.—P. Mackintosh.

Silvestri, F. Gl'insetti parassiti delle piante. [**The insect parasites of plants.**] *Ital. agric.* **85.** 408-26. 1948. **75**

At the meeting of Southern Agriculture held at Portici (Naples) from 13th to 15th March, 1948, the author presented this review of the principal crops of South Italy, their parasite insects and the damage caused. The different methods of control (artificial, agronomic and biologic) are illustrated.

The formation of organizations for plant protection in South Italy, among which an Entomological Institute at the Agricultural Department of Portici, was proposed.—E.B.

Ross, D. M., Stapley, J. H., and Cockbill, G. F. **Wireworm populations in relation to crop production. V. Comparisons between failing and successful plots.** *Ann. appl. Biol.* **35.** 193-206. 1948. **76**

Thirteen fields showing damaged and undamaged areas were studied. Data were collected on wireworm populations, chemical and mechanical composition of the soil, feeding reactions of the wireworms collected and agricultural history and treatment of the plots and fields. In 6 only of the fields did damaged areas coincide with areas of higher infestation. In the remainder the failures occurred at low populations and these varied widely in the different fields. $CaCO_3$ was consistently higher and sand content consistently lower on the failing plots. The results show clearly that factors other than infestation play an important part in determining the amount of wireworm damage.—K.J.S.

D'Aguilar, J., and Grison, P. Premières études sur le problème des taupins en Bretagne. [**Preliminary studies on the wire worm problem in Brittany.**] *C. R. Acad. Agric. France* **34.** 261-7. 1948. **77**

БЕЛЬСКИЙ, Б. И. О значении особенностей вкуса у крапчатого суслика. *Природа, Москва* 1948. *No.* 3, стр. 68-9.

Beljskiĭ, B. I. [**The significance of the preference of *Citellus suslica* for certain feeds.**] *Priroda, Moskva* 1948. No. 3. 68-9. **78**

A great increase recently in the numbers of marmots has necessitated the taking of control measures. A study of the feeds liked by these herbivores has been made at the Mironov Selection Station in the Kiev Province. It is concluded that to eradicate the pest, crops which they consume in small quantity should predominate on the farms. These are primarily maize and oil-bearing Cruciferae. Crops which are consumed readily by the marmots are millet, buckwheat, oats and, especially, sunflowers.—M.H.

WEEDS

Lähde, V. Kemiallisten aineiden käytöstä rikkaruohojen torjunnassa. [**Chemical means of weed control and their value.**] *Maatalous ja koetoiminta* **3.** 136-53. 1948. **79**

Of the different chemical weedkillers calcium cyanamide ($CaCN_2$), chlorate and hormone derivatives are the best known in Finland. The article gives an account of the results of trials made by the Department of Crop Husbandry of the Central Agricultural Experiment Station at Tikkurila. Good results were obtained from the use of calcium cyanamide (150-200 kg. per ha.), especially in spring-sown cereals. Chlorates are recommended for the extirpation of perennial, vegetatively propagated weeds. The usual time to apply chlorates is in August after the grain harvest, on clay soils 150-200 kg. and on sandy soils 200-300 kg. per ha. Experiments with hormone preparations have been in progress since 1946. For the present this last-named means of weed control is of less importance.—O.V.

Hilli, A. Rikkaruohomme ja niiden taloudellinen merkitys. [**Weeds in Finland and their economic importance.**] *Maatalous ja koetoiminta* **3.** 154-68. 1948. **80**

The Advisers and other local officials of the Finnish Ministry of Agriculture conducted in 1944 an enquiry into the distribution of the various weed species in the different agricultural provinces of the country. The commonest vegetatively reproduced weeds were *Agropyron repens*, *Cirsium arvense*, *Sonchus arvensis* and *Tussilago farfara*, and the commonest seed-propagated species *Galeopsis* sp., *Chenopodium album*, *Raphanus raphanistrum*, *Spergula arvensis* and *Stellaria media*. The weeds most widespread in cultivated pastures were *Taraxacum vulgare*, *Rumex* sp., *Matricaria inodora*, *Ranunculus* sp., *Chrysanthemum leucanthemum* and *Barbarea vulgaris*. Weeds reduced crop yield by about 12 per cent.—O.V.

ÅSLANDER, A. En ofarlig kloratmetod ? [**A safe chlorate method ?**] *Lantm. Svenskt Land* **32.** 560. 1948. **81**

In Sweden in the summer of 1947 chlorate injuries were reported in a number of places. The two circumstances which render the chlorate method hazardous (particularly when the instructions given are not carefully followed) are too little rainfall and inadequate draining. An experiment was conducted in the latter part of the summer of 1947 on a waste plot in which it was intended to plant berry bushes. The chlorate was dissolved in water and distributed over the area at the rate of 150 kg. per ha. on 3 August. The weather was favourable, atmospheric and ground temperature being high (22° at a depth of 20 cm.). In the late summer and autumn there was practically no rainfall. The ground was too hard for cultivation in the autumn of 1947, but it was ploughed on 18 April 1948. To determine the chlorate content, samples of soil and subsoil were taken in which barley, which is exceedingly susceptible to chlorate, was sown. For comparison sowing was also carried out in other garden soil. The chlorate content in the soil was very low or nil. Barley made excellent growth. The area has been sown with potatoes which are growing well. The autumn of 1947 was most unsuitable for the chlorate treatment. Rainfall was exceptionally sparse, but in this case all perennial weeds were completely eradicated without injury to the subsequent crop, and this on a stiff, not readily permeable clay soil. This new chlorate method is more effective and cheaper than previous methods.—R.P.J.

KONINGSBERGER, V. J. Nieuwe groeistof-onderzoekingen. [**Recent research on growth substances.**] *Landbouwk. Tijdschr.* **60.** 159-64. 1948. **82**

A review of research on growth substances carried out during the war in the U.S.A., Britain, the Netherlands and Switzerland mentions, among other points, the application of growth substances to weed control.—G.M.R.

VIOLA, C. Il potere moltiplicativo delle principali piante infestanti della Piana di Catania. [**The propagation ratio of the principal weeds of the Catania plain.**] *Ann. Sper. agr.* **1.** 371-94. [English summary, pp. 392-3.] 1947. **83**

The different factors which influence the noxiousness of weeds are considered, and the rate of diffusion by sexual reproduction is stressed; "generative power" is expressed by the number of seeds produced by a single plant, and "multiplication power" by the number of actually viable seeds produced by a single plant.

"Multiplication power" is determined for 27 of the principal weeds of the Catania plain, which are classified as follows in decreasing order: *Ridolfia segetum* Moris; *Daucus carota* L.; *Anagallis arvensis* L. var. *coerulea*; *A. arvensis L.* var. *phoenicea*; *Anthemis fuscata* Brot.; *Papaver rhoeas* L.; *Linaria reflexa* Desf.; *Phalaris paradoxa* L.; *Ph. coerulescens* Desf.; *Chrysanthemum myconis* L.; *Ammi crinitum* Guss.; *Bellis perennis* L.; *Silene fuscata* Link; *Ammi majus* L.; *Lolium perenne* L. var. *multiflorum*; *Ornithogalum pyramidale* L.; *Bromus mollis L.*; *Avena sativa* L. var. *fatua*; *Cerinthe major* L. var. *elegans*; *Iris sisyrinchium* L.; *Convolvulus tricolor* L.; *Bromus sterilis* L.; *Hyacinthus romanus* L.; *Nigella damascena* L.; *Gladiolus segetum* Ker-Gawl; *Lavatera trimestris* L.; *Bupleurum rotundifolium* L.

Field experiments are in course in order to determine the specific noxiousness of each species. In such experiments a unity of surface under cultivation is infested with the same number of weed seeds.—E.B.

SCURTI, J. Chiave analitica per il riconoscimento delle piante infestanti attraverso i semi. [**Analytical key for identification of weeds through their seeds.**] Suppl. to *Ann. Sper. agrar.* **2.** pp. 45. [English summary p. 45.] 1948. **84**

This key, compiled on the dichotomical method, is limited, for the present, to the principal weeds of the Catania plain. It leads to the determination of the family and also of the genus, when the characters of a seed are very different from all other needs belonging to the same family. A key to the genera and description of every species is also given. Twenty plates illustrate all the seeds.—E.B.

BENSA, S. Esperimenti con ormoni sintetici applicati a talee e come erbicidi. [**Experiments with synthetic hormones used on cuttings and against weeds.**] *Ann. Sper. agrar.*. **2.** 371-81. [English summary p. 381] 1948. **85**

"Weedone," a selective herbicide, is harmless only to gramineous plants. In solution at 1 per cent it destroys the following weeds: *Inula viscosa*, *Ranunculus sceleratus*, and other species, *Erigeron canadense*, *Beta vulgaris*, *Potentilla reptans*, *Parietaria officinalis*, *Convolvolus arvensis* and other species, *Plantago*, etc. Destruction of the following plants appears not to be complete: *Arisarum vulgare*, *Arum italicum*, *Oxalis*, *Rumex*, and *Rosa canina*. Experiments are to be continued.—E.B.

HAMEL, A., and DANSEREAU, P. L'aspect écologique du problème des mauvaises herbes. 1. [**The ecological aspect of the weed problem. 1.**] *Agriculture, Québec* **5.** 23-36. 1948. **86**

The valley of the Saint Laurence has provided most of the examples quoted in this memoir. This first part consists of a general exposition of the argument and relative conclusions. It is pointed out that the development of an adventitious flora (weeds are the species showing a particular harmfulness) takes place within definite ecological limits. A number of weeds do not belong to the local flora but are found in different countries and seem to follow men on the cultivated areas. Therefore the environment which favours the development of weeds is an artificial one and these adventitious plants are rapidly replaced by the natural vegetation, if human action ceases.—E.B.

CORNS, W. G. **Translocation of 2, 4-D in injected flowering perennial sow thistle plants.** *Canad. J. Res.* **26.** Sect. C. 239-48. 1948. [Dept. Plant. Sci., Univ Alberta, Edmonton] **87**

Injection of single flower heads with weed-killing concentrations of 2, 4-D caused the solution to travel down the peduncles of treated heads and upwards through neighbouring intact peduncles, i.e. towards actively developing regions. Injection of severed stems resulted in extensive kill of intact branches. It appears that the solution was translocated upwards through the xylem and downwards through the normal path of nutrients to reserve organs. If these conditions hold in practice it may be advisable to mow thistles at some inches from the ground before spraying.—K.J.S.

CANADA Department of Agriculture. Publ. No. 807. Circ. No. 178. **Simplifying 2, 4-D.** By *G. Knowles.* 1948. pp. 8. **88**

A guide to the 110 proprietary brands of 2, 4-D (classified as amine, ether and salt derivatives) registered for sale in Canada, showing the amount of each required to supply customary rates of pure 2, 4-D per acre. Short notes are given on the susceptibility of cereal and flax crops to damage by 2, 4-D under Canadian conditions; recommendations for controlling mustard and stinkweed are given.—K.J.S.

WEAVER, A. J. **Contratoxification of plant growth regulators in soils and plants.** *Bot. Gaz.* **109.** 276-300. 1948. [Univ. Chicago] **89**

Toxicity of soil after treatment with different compounds of 2, 4-D (as herbicide) at concentrations of 22 and 220 p.p.m. was investigated by its effect on kidney bean, white mustard and barley planted in the soil at various intervals after treatment.

Toxicity of the soil was destroyed by ploughing by the use of a cation exchanger, Zeo Karb H, or by an adsorbent, Novit (activated charcoal). Ploughing resulted in a great decrease in toxicity of soil contaminated with 2, 4-D compounds. Both chemicals were effective in destroying toxicity of 2, 4-D whether mixed with the soil or sprayed or dusted in to the aerial parts of the plant.—D.B.

JORGENSEN, C. T. G., and HAMNER, C. L. **Weed control in soils with 2, 4-dichlororophenoxy-acetic acid and related compounds and their residual effects under varying environmental conditions.** *Bot. Gaz.* **109.** 324-33. 1948. [Michigan State College, East Lansing] **90**

The sodium salt of 2, 4-D, the methylester of 2, 4-D and the acid itself were used at 2, 8 and 16 p.p.m., at four different temperatures, namely, 0°F. (cold room), 36°F. (storage), 45-80°F. (outdoor) and 80-105°F. (greenhouse), and at three different soil moisture levels, namely, saturation, optimum and air dry, up to time of planting with test seeds. Of the three chemicals tested, no great differences in the degree of persistency of their toxicity could be observed in soils kept at optimum moisture and greenhouse temperatures. At low temperatures (0°F. and 36°F.) toxicity of 2, 4-D was retained for long periods compared with the the outdoor and greenhouse temperature. Air-dry soil also retained toxicity. The findings suggest that, in order to permit early use of the soil, there should be a high moisture content of the soil following application of these chemicals, that low concentrations are adequate (2 p.p.m. corresponding to 2lb. per acre to a depth of 3 in.), and that caution should be exercised during periods of drought. Maize was more able to withstand toxicity of 2, 4-D than were pea or radish. Grasses as a group are more resistant than dicotyledons. —D.B.

DOMATO, J., and ARAMAYO, H. Las hormonas y sus posibles aplicaciones en la agricultura. [**Hormones and their possible applications in agriculture.**] *Bol. Est. Exp. Agric. Tucumán* No. 62. 1947. pp. 20. [Est. Exp. Agric., Tucumán, Argentina] **91**

Cyperus rotundus (nut grass) is one of the worst weeds of field and horticultural crops in the Argentine province of Tucumán and is extremely difficult to eradicate on account of its subterranean, rhizome-forming tubers, the distribution and vigour of which are enhanced in cultivated lands. An account is given of experiments in control by means of 2, 4-D, including some preliminary trials and one in which 17 plots were treated on different dates from 16 Oct. to 21 Nov. 1947, the weed being at different stages of development and the concentration of the weedkiller ranging from 0.03 to 0.3 per cent. The effect on the foliage and stems was on the whole satisfactory, a kill in some cases of 95 per cent and over being achieved in 20 days from treatment, and the action of the 2, 4-D generally penetrated as far as the growing point, 5 cm. below the surface, but the great majority of the tubers were unaffected, and further trials are in progress to test the effect on these of repetitions of the treatment, combined—or not—with the use of additional substances which might conceivably increase its efficacy.

Appendices furnish lists (a) of weeds on which 2, 4-D has been tested at Tucumán, and (b) of field crops and horticultural plants treated, with notes on the degree of susceptibility in each case.—G.M.R.

HAWAII Agricultural Experiment Station. Circ. 26. **Plant growth regulators as selective herbicides.** By *E. K. Akamine*. 1948. pp. 43 **92**

The historical development of the use of plant growth regulators, beginning with the claim to the discovery of their herbicidal properties by Jeallot's Hill in 1940, is reviewed. The material is arranged under the following heads: selectivity of growth regulators applied as foliage treatment, applied to soil and in nutrient culture; persistence of 2, 4-D toxicity in soil; methods of applying 2, 4-D; morphological and histological responses; determination of growth regulators (bio-assay, use of radio-active compounds, chemical); synthesis and chemical properties of growth regulators; physiological studies of herbicides; effect of 2, 4-D on animals and man: I.P.P.C.; other historical reviews of weed control; popular publications on hormone-type herbicides.—K.J.S.

CEREALS

SAULI, J. O. Tärkeimmät korsiviljajalosteemme. [**The principal varieties of cereals grown in Finland.**] *Maatalous ja koetoiminta* **1.** 81-98. 1946. **93**

The article is concerned with the principal varieties of cereals grown in Finland, winter rye, winter wheat, spring wheat, barley and oats, on the basis of the results of trials made by the national experiment stations and in local farm experiments. The material included new varieties from the two Finnish plant breeding stations at Jokioinen and Tammisto as well as foreign varieties, mainly from Sweden and Denmark.

Because of the bad conditions for wintering caused by the severe cold, producing frost injuries, or deep cover of snow, producing damage from *Fusarium* and other fungi, the Finnish bred strains have proved the most reliable under cultivation. Of rye varieties, the Finnish strains Oiva, Toivo, Onni, Pekka and Eusi may be mentioned. The last-named variety is grown as midsummer rye, for sowing is done at midsummer together with oats and legumes: a green fodder cut is taken in the seeding year and the rye crop matures the year after. The Finnish winter wheat variety generally grown is Varma, but under severe winter conditions and in poor land Olympia is also grown.

The Svalöf variety Diamond occupies a dominant position among the spring wheats. Diamond II is grown to a smaller extent, in good, calcareous soils in the south of Finland. Kimmo, Tammi, Hopea and Sopa are Finnish bred strains which may be mentioned. They mature earlier than Diamond.

Barley is a very important crop throughout Finland. In the south two-row varieties are those generally grown, and the Danish variety Binder is the most widely diffused. It is, however, low-yielding compared with new Danish and Swedish varieties. The Abed variety Maja, for example, has given a 10 per cent higher grain yield. The Finnish Tammi is the six-row variety most commonly grown in Finland, as well as the Svalöf variety Vega.

Oats are the most commonly grown cereal in Finland, and good oat varieties are therefore of considerable economic importance. Growers are interested in white or yellow oats as well as black oats, and also in meal and fodder oats. Svalöf Golden Rain II is the variety most widely used in the south and middle of Finland, and Svalöf Orion II in the north. Together with these, many Finnish varieties, such as, for example, Kyto, Tammi and Eho, are cultivated, all from Tammisto.—O.V.

CAPPELLETTI, F. Note preliminari per un programma decennale tecnico-agrario per lo sviluppo dell'agricoltura eritrea. [**Preliminary notes for a technical-agricultural ten years' programme for the development of Eritrean agriculture.**] *Riv. Agric. subtrop. e. trop.* **42.** 35-41. 1948. **94**

Agriculture in Eritrea is almost exclusively cultivation of cereals, mainly durra, maize, barley and wheat. Its development is hindered by the low and irregular rainfall. Therefore early cereal varieties are to be preferred. The best time of sowing is at the start of the great rains, as only after the first rainfalls it is possible to work the land.

A scheme for development of agriculture in this region is presented. Its principal points are: selection work to be carried out on local and imported cereal varieties and establishment of observation centres for the principal cereal crops (the more suitable localities are indicated). Potato and coffee are also considered. The Department of Eritrea conducts a certain number of farms for experimental purposes: the programme of work for these farms will be treated separately. The problem of agricultural instruction and propaganda among the natives, who generally oppose any sort of innovation, is dealt with.—E.B.

MERTIN, J. V. **Progress report on oat improvement in South Australia.** *J. Dep. Agric. S. Aust.* **51.** 532-7. 1948. [Roseworthy Agric. Coll.] **95**

As a prelude to the resumption of oat breeding in 1946 a survey was made of oat production in South Australia. The trends revealed by the survey and the objectives and progress of the oat improvement programme at Roseworthy Agricultural College are described. The growing of oats for hay showed a slight increase in 35 years and oats planted for grazing showed a strikingly rapid expansion in acreage during the previous 15 years. The farmer himself wants a multi-purpose oat which will produce a large bulk of early green feed, can be grazed several times, possesses good powers of recovery and which will later produce a good yield of grain or a good, strong-strawed hay crop. To produce such an oat is the problem before the oat-breeder.—G.M.H.

TEXAS Agricultural Experiment Station. Bull. No. 691. **Oat production in Texas.** By *I. M. Atkins* and *E. S. McFadden.* 1947. pp. 66. **96**

Oats occupy a prominent position among the farm crops in the State. Apart from the grain yield, they provide a valuable winter pasture crop, as well as a winter cover for the soil. The greater percentage of the oats produced is utilized as livestock feed. As corn or cotton provide good seedbeds for oats, in Central Texas oats usually follow these crops. In West Texas, where oats are autumn sown, they will follow practically any crop. Rates and dates of seeding in the various regions of the State are given as well as information on harvesting and threshing. Varieties of oats grown commercially in Texas and the principal diseases which affect the crop are described. —P.M.

HOON, R. C., DHAWAN, C. L., and MADAN, M. L. **The effect of certain soil factors on the yield of major crops in the Punjab. II. Rice.** *Indian J. agric. Sci.* **16.** 356-79. 1946. [Res. Inst. Lahore] [Received 1948] **97**

Soil samples from the Gujranwala and Shieklupura districts were analyzed and the results used to determine statistical correlations with figures for rice yields at those sites. It was shown that pH, exchangeable sodium and degree of alkalinity were the characters which showed significant correlations with yield for the soils of the Gujranwala district and for the soils of Sheiklupura districts, exchangeable calcium and sodium, degree of alkalinity and nitrogen were the characters.—G.M.H.

BRAVO, A. F. El cultivo del arroz en el noroeste de la provincia de Corrientes. [**Rice growing in the north-west of the province of Corrientes.**] *Granos* **10.** Nos. 10, 11 and 12. 26-32. 1946. [Dir. Agron. Reg., Min. Agric., Argentina] **98**

The first experiments in growing rice in the Argentine province of Corrientes took place in 1924: by 1943-44 the rice area was 7568 ha. Information is given on the geographical distribution of the culture, on the varieties grown (in order of importance, Blue Rose, the Japanese varieties Pragana and Gigante, and a Ministry of Agriculture selection from Yamaní), on sowing technique, irrigation and harvesting, yield, costs of production and prices, milling, and prospects. The availability of water for irrigation will probably result in more rice growing in the fertile lands by the river Paraná, and a reduction in some other localities where the droughts of recent years have affected water supplies.—G.M.R.

ROLET, R. Essais de culture du riz en Oubangui-Chari. [**Rice cultivation trials in Ubangi Shari.**] *Potasse* **22.** 113. 1948. **99**

With a view to examining the possibilities of growing rice in the south of France, the writer describes his experiences in the mountains of French Equatorial Africa cultivating the variety known as mountain rice. He arrives at the conclusion that though temperature requirements could be fulfilled, the rainfall is not adequate.—D.B.

VALLE, O. Diamantvårvetets betydelse för veteodlingen i Finland. [**The importance of Diamond spring wheat for wheat growing in Finland.**] *Sver. Utsädesfören. Tidskr.* **58.** 53-63. [English summary, p. 63.] 1948. [Prof. Cent. Agric. Exp. Sta., Tikkurila, Finland] **100**

Wheat is a very ancient crop plant in Finland (which lies between 60° and 69°N.), but occupied formerly an insignificant area. Up to about 1930 the spring wheat area was 4000 ha. and that of winter wheat 10,000, together only 0.6 per cent of the arable land. From 1930 onwards a great development took place, so that in 1939 the spring wheat area was 111,000 and the winter wheat 25,000 ha. This increase was due to Government measures in subsidizing both the grain industry and the wheat grower. At the same time the long, warm summers of the 1930's were unusually favourable for wheat growing. In 1946 the total wheat area was 157,000 ha., of which spring wheat occupied 145,000 ha. or 6.1 per cent of the total arable land. As winter wheat can be grown only in the clay soils of the south of Finland and is deficient in winter hardiness, spring wheat has become dominant. There is a possibility of Finland's becoming absolutely self-sufficient in wheat when the yield per ha. is improved by better manuring and cultural technique.

The most valuable spring wheat variety has proved to be the Svalöf Diamond (Diamant) which appeared on the market in 1928 and now occupies a dominant position in the south and middle of Finland, from 60° to at least 62°N. The warm summers experienced from 1930 onwards have contributed to the spreading of Diamond wheat far to the north.

Field trials have shown that the old Diamond wheat is much better adapted to acid soils than Diamond II, for which reason the latter variety is little diffused in Finland. Diamond wheat occupies over 80 per cent of the whole spring wheat area. Spring wheat is now grown as far north as 66°N., and in the northernmost parts the variety principally grown is Tammisto, which matures about one week earlier than Diamond.—O.V.

GRILLOT, G. Les blés tendres au Maroc. [**The soft wheats of Morocco.**] *C.R. Acad. Agric. France* **34.** 323-7. 1948. **101**

The cultivation of soft wheats in north Africa was practised in ancient times, but with the exception of certain endemic oasis forms (*Triticum vulgare* var. *oasiculum*) soft wheats have been replaced by hard wheats following on the Arab invasions. Efforts have been made to improve soft wheat from material from the Mediterranean, India and Australia. The work is based on the principle that earliness is not incompatible with yield. The object is to obtain high-yielding varieties which could mature early enough to escape the heat and drought of May and June and the hot, dry winds from the east. An account is given of the progress with these types.—D.B.

GOENAGA, J. L. El cultivo del trigo candeal en la zona de Tres Arroyos, provincia de Buenos Aires. [**The cultivation of *Triticum durum* in the Tres Arroyos region of the province of Buenos Aires.**] *Granos* **11.** Nos. 1-3. 41-2. 1947. [Dir. Agron., Reg., Min. Agric., Argentina] **102**

A radio address gives advice on the cultivation of *Triticum durum* in the Tres Arroyos region which has a wheat-growing area of over 150,000 ha.—G.M.R.

JANNACCONE, A. La sistemazione del terreno in Capitanata ed il metodo Del Pelo Pardi. [**Soil regulation in Capitanata and Del Pelo Pardi's method.**] *Ital. agric.* **85.** 327-34. 1948. **103**

Soil regulation, in conditions prevailing in the plain of Capitanata consists in works which favour the absorption of the water into the soil. Different methods of regulation have been compared in trials carried out in 1940 on lots of ground sown with wheat, maize and lucerne. The aim of these trials was to investigate how the different methods influence soil porosity and the humidity of the soil during the dry season. The author is of the opinion that Del Pelo Pardi's method gives the best results.—E.B.

BUREMA, D. E. De zomergranen in het gemengde zandbedrijf. [**The summer cereals on the mixed farm in the sand areas.**] *Maandbl. LandbVoorl-Dnst* **5.** 420-5. 1948. [Chief Asst. for Arable Land Farming, West Overijssel, Netherlands] **104**

The area devoted to cereals on the mixed "sand" farms, although somewhat reduced in recent years, is considered to be still excessive. Oats and summer barley are the most suitable cereals for the region, summer wheat is less useful as a feeding stuff and suffers more from drought. Any extension of summer cereal growing should take place at the expense of winter cereals, especially rye, but not of roots. The place of summer cereals in the cropping system and measures for obtaining better yield per unit area are discussed.—G.M.R.

CROCIONI, A. Osservazioni sulla consociazione fra varietà di granoturco. [**Observations on growing two varieties of maize together.**] *Agricoltura ital.* **47.** 8. 1947. **105**

At the experimental farm of Corticella of the Agronomy Institute of Bologna, two varieties of maize, Firster (of American origin) and Nano Merlino (of the Plant Breeding Institute of Bologna) have been grown together, alternating the two varieties in double rows. Data of production, in comparison with control plots, are reported. Although definite conclusions have not been reached, it is believed that this system of growing maize could be of practical advantage in regions where climatical conditions vary considerably from one year to the other and therefore are more favourable to one or to the other variety.—E.B.

AGRICULTURAL GAZETTE OF NEW SOUTH WALES (The). **Value of red clover in maize and oats rotations. Yields improved and fertility maintained. Results at New England Experiment Farm.** *Agric. Gaz.* **59.** 339-43. 1948. **106**

The net result of including red clover in the rotation maize/spring oats was to increase the total yield of maize, only slightly decrease the total yield of oats, and provide grazing for 3 sheep per acre for 9.5 years over the 24-year period of the experiment. The effect of including a crop of red clover after maize and 2 oat crops was to increase the average yield per acre, give 6 swards of clover for grazing and reduce the production costs of the crops of maize and oats to three-quarters of those of the maize/spring oats/autumn oats rotation. Favourable results over the 24-year period were also obtained when red clover was included after 2 maize crops and an oat crop.—G.M.H.

DENMARK, Statens Forsøgsvirksomhed i Plantekultur. Medd. 400. Saatidsforsøg med Rug og Hvede 1940-45. [**Date of sowing trials with rye and wheat 1940-1945.**] 1947. pp. 4. **107**

The trials were conducted at the Danish State Experiment Stations to investigate the importance of sowing winter cereal crops at the right time and he possibility of counteracting the decrease in yield with late sowing by giving an additional amount of 100 kg. nitrogenous manure per ha. in he autumn at the time of sowing; for the rest manuring consisted of 2-300 kg. saltpetre per ha. Trials with rye were conducted at 6 experiment stations during all 6 years, but failed at some centres in 1942 owing to winter injury. Trials with wheat were laid down at 7 experiment centres but were everywhere destroyed by frost in 1942. At one station the trials were destroyed for the ame reason in 1940 and 1941, while 2 stations carried out only a few trials.

Trials with rye

The sowing dates tested were 25th August, 0th and 25th September, 10th and 25th October. The first sowing date was in a few trials delayed or two or three days. The rye variety was in general Petkus, at one Station Svalöf Staal.

The crop yield per ha. on the average of all he experiment centres was as follows :

Sowing date }	25 Aug.	10 Sept.	25 Sept.	10 Oct.	25 Oct.
940-45 hkg. grain	26.0	26.6	24.4	21.8	19.6
940-45 Rel. no., grain	100	102	94	84	75
940-42 ,,	100	103	93	79	72
943-45 ,,	100	102	94	88	78
940-45 ,, straw	100	100	86	75	70

The straw yield has been more strongly influenced by late sowing than the grain yield with a reduction for the last 3 sowing dates in elation to the first sowing date of 14, 25 and 30 per cent.

Autumn manuring with 100 kg. saltpetre per a. has given the following result in relative umbers for grain yield :

	1st sowing date	2nd sowing date	3rd sowing date	4th sowing date	5th sowing date
00 kg. saltpetre, autumn	100	101	92	81	72
No manuring in autumn	100	102	94	84	75

Trials with wheat.

The sowing dates tested were 15th and 30th September, 15th and 30th October. The dates were delayed in some trials owing to unfavourable weather, and in a few cases it was not possible to carry out the last sowing. The wheat varieties used were as a rule Svalöf Skandia II or Pajbjerg Konge II.

Results were as follows :

Sowing date }	15 Sept.	30 Sept.	15 Oct.	30 Oct.
1940-45 hkg. grain per ha.	37.4	35.4	33.1	28.0
1940-45 rel. no., grain	100	95	89	75
1940-41 do. do.	100	91	82	68
1943-45 do. do.	100	97	92	79
1940-45 do. straw	100	91	83	70

As in the case of rye the straw yield has declined more markedly with late sowing than the grain yield. The decrease in yield with the 3 late sowing dates has been respectively 9, 17 and 30 per cent.

The trial to nullify the decrease in yield with late sowing by applying nitrogenous manure in the autumn has given the following results :

	1st sowing date	2nd sowing date	3rd sowing date	4th sowing date
100 kg. saltpetre, autumn	100	95	90	77
No manuring in autumn	100	95	89	75

—R.P.J.

BOSCH, L. De roggeteelt in het gemengde zandbedrijf. [**Rye cultivation on the mixed farms of the sand areas.**] *Maandbl. LandbVoorlDnst* **5.** 415-20. 1948. [Chief Asst., Agric. Adv. Office, Arnhem, Netherlands] **108**

On the farms in the region in question the rye area should be reduced in favour of roots and forage crops. Through the better cropping system resulting and through the adoption of better cultural technique as described in the article, a considerably higher average yield of rye per unit area would be obtainable.—G.M.R.

WIDIEZ, F. La culture du sorgho à balai dans le Vaucluse. [**Cultivation of broom sorghum in Vaucluse.**] *Potasse* **22.** 10-1. 1948. **109**

In 1947, 2500 ha. were planted to broom sorghum (*Sorghum vulgare*) in this district. Cessation of imports from Italy has raised the price and made it worth while for farmers to grow this crop. The Italian varieties with long stems are used to cover the outside of the brush while the local varieties with low stems produce a harder and more resistant bristle for the useful part of the broom.

Seed is sown in April or May after the last frosts. The rows are 0.8 m. apart. The plants are thinned to a distance of 20-30 cm. apart in order that the plants shall not suffer from a humid atmosphere. End of June the plants are banked up with the aid of the plough, and superfluous shoots are pulled off. Moderate irrigation gives a yield which is both more abundant and of better quality. The crop is harvested when the panicle is yellow. This is usually at the end of September and before the onset of the autumn rains. Yields can reach 20 quintals per ha. of grain and of straw. The grain is fed as forage and the straw delivered to industry either locally or in the west of France.

Unfortunately, these yields are seldom obtained because of the ravages of a caterpillar *Sesamia vuteria* which infests the inside of the stalk and is very difficult to control. The most effective method of control is to destroy the stubble (which provides winter quarters of the overwintering larvae) and to powder the young plants with insecticides.—D.B.

Bologna, Istituto di Agronomia e Coltivazioni erbacee dell'Università. Esperienza per la determinazione della caloria lasciata dal sorgo zuccherino in confronto con le principali colture da rinnovo della pianura emiliana. [**Experiment to determine the residual fertility left by sweet sorghum in comparison with the principal spring-summer crops of the Emilia plain.**] *Agricoltura ital.* **47.** 14-34. 1947. **110**

Trials carried out at the experimental field of the Agronomy Institute of Bologna have shown that residual fertility left by sorghum is considerably lower than that left by maize and even lower than that left by sugar beet and hemp, which have proved to be the best crops to precede wheat cultivation. Fixing 100 as the grain product of wheat grown after hemp or beet, the product after maize is 95 and after sorghum 80-86. Nitrogen deficiency of the soil is the cause of the low wheat yield after sorghum cultivation. A good manuring mainly with nitrogen fertilizers eliminates these injurious after-effects. As leguminous plants do not resent damage by a preceding sorghum cultivation, the following rotation is suggested for the Bologna plain: hemp/wheat/sweet sorghum/lucerne (for 4 years) /wheat/sugar beet/wheat.—E.B.

Goidanich, G. Antipatia fra le piante agrarie. [**Antagonism among agricultural plants.**] *G. Agric.* **58.** No. 26-27. 6. 1948. **111**

With reference to an alleged case of incompatibility between wheat and apple-tree, the author reviews the subject of incompatibility among agricultural plants and expresses the opinion that the alleged incompatibility does not exist, under normal conditions.—E.B.

БАХТЕЕВ, Ф. Х. Является ли видом *Hordeum agriocrithon* Åberg? *Доклады Акад. Наук СССР* Том 57. *No.* 2. стр. 195-6. 1947.

Bahteev, F. H. [**Is there a species** *Hordeum agriocrithon* **Aberg?**] *Doklady Akad. Nauk SSSR* **57.** 195-6. 1947. [Bot. Garden, Acad. Sci. USSR, Moscow] **112**

In 1938 Åberg published his paper on this six-rowed barley. [*Ann. agric. Coll., Sweden.* 6, 1938]. Up to then no one had succeeded in establishing the fact that a wild six-rowed barley existed, and the natural occurrence of such a plant in many respects changes contemporary ideas regarding the phylogeny of barley. Conceptions are put forward from which it is assumed that *H. agriocrithon* is not an authentic species, but is, no doubt like most cultivated barleys, a type produced under some soil conditions especially suitable for it. —M.H.

Netherlands, Nationaal Comité voor Brouwgerst. Verslag van het brouwgerstrassen-proefveld te Barendrecht in het jaar 1944. [**Report of variety trials of malting barley at Barendrecht, 1944.**] *Med. nat. Com. Brouwgerst* 1945. No. 11. 89-162. [English and French summaries, pp. 159-61.] **113**

In a trial of 13 varieties the following have emerged as equal to or surpassing the standard variety Abed Kenia (Denmark): Balder (Sweden), Abed Rigel (Denmark), Svalöf 40/15 (Sweden), and Hylkema 621 (Stella, Netherlands). The four varieties named are equally useful for the farmer and the brewer.

The use of an experimental malting house in a Rotterdam brewery now makes it possible to obtain reliable information on malting quality from small samples of a few kilograms, so that a great economy in trial space can be effected and a much larger number of varieties can be tested on the same area. Plots of 1 are (= 100 sq. m.) now replace the former 1 hectare (= 100 ares) plots.—G.M.R.

Netherlands, Nationaal Comité voor Brouwgerst. Verslag van het brouwgerst-rassenproefveld te Barendrecht in de jaren 1945 en 1946. [**Report of variety trials of malting barley at Barendrecht, 1945 and 1946.**] *Med. nat. com. Brouwgerst* 1948. No. 14. 216-322. [French and English summaries, pp. 283-8.] **114**

Several varieties were added to the 13 tested in 1944 (see Abs. 113), the main object of the trials being to compare the performance of new varieties with that of the one generally grown in the Netherlands, Abed Kenia. In a detailed account of the findings, based variously on 1, 2, or 3 years' trial, agricultural and malting values are discussed separately, comparisons being made, where feasible, with the 1944 results. Agricultural value is judged according to the following characters: grain yield (the most important), then earliness, length and stiffness of straw, and lastly soil cover, early earing, and leafiness. Straw yield was not taken into account. Malting and brewing value is based on analysis of the barley (grading, thousand-grain weight and protein content, whether over 11.5 per cent or below 9 per cent) and on malt analysis. The effects of a nitrogenous fertilizer have been studied. They include the following: (a) agricultural qualities, increased yield of grain and straw but also an increase in lodging; (b) malting any brewing qualities, increased protein content, decrease in thousand grain weight, increased waste, coarser chaff, and (malt analysis) decreased quantity of extract, decreased quantity of soluble nitrogen, and increased diastatic power. Varieties differ in degree of susceptibility to N, but generally speaking the malting quality of barley deteriorates when excessive doses of nitrogenous fertilizer are applied.

The following varieties are retained: Balder (Sweden), Pajbjerg Drot (Denmark), Abed Kenia (Denmark), and Saxonia (Germany). Kenia and Saxonia are good industrial barleys, the first-named for heavy, the second for sandy soils. Balder was sown on a large scale in 1947, and it remains to be seen to what extent it can replace Kenia, which has a somewhat lower grain yield. Pajbjerg Drot requires further testing.

The trial of new varieties continues.—G.M.R.

LINDEMAN, J. C. Het onderzoek van gerstrassen aan de korrel. [**The classification of barley varieties by means of the grains.**] *Med. nat. Com. Brouwgerst* No. 13. 197-214. [English summary, p. 213.] 1947. [Bot. Mus. Herb., Utrecht, Netherlands] **115**

Useful characters for identification are found in the number of teeth on lateral lemma nerves; colour of aleurone; average length of kernel measured from the base of the hull to the top of the caryopsis, which must be freed for the purpose; average length of rachilla; colour of the lemma nerves. Control characters which may be used are wrinkling of hulls; number of teeth on marginal lemma nerves and lemma border; visibility of the midnerve; colour of hulls. Tables of varietal characters are provided for the identification of numerous two-row barleys of the *nutans* types and for the four-row Bigo variety.—From author's summary.

WYOMING Agricultural Experiment Station. Bull. 283. **Barley varieties for Wyoming.** By *D. L. Klingman.* 1948. pp. 20. **116**

Recommended varieties for irrigated land and dry-land are given. For irrigated land in the State, the following are noted: Frontier, a rough-bearded barley with erect mid-dense heads and relatively strong straw. It is a vigorous, six-row variety and has been only slightly smutted under Wyoming conditions; Lico, which is susceptible to loose smut is a smooth-bearded six-row variety giving higher yields than either Velvon or Trebi; Velvon is smooth-bearded, six-rowed and is very resistant to covered smut, but susceptible to loose smut; Trebi yields less than Velvon, but is resistant to loose smut and susceptible to covered smut. It has a tendency to lodge.

For dry-land, Compana, Spartan and Smyrna, all two-row varieties and Beecher, a six-row variety, are recommended. Compana is smut-resistant, short and weak-strawed, with a high test weight. Spartan has strong straw and produces excellent feed grain. It has a tendency to shatter if allowed to stand until fully ripe and is susceptible to loose and covered smut. Smyrna, although short and relatively weak-strawed is a high-yielding variety. Beecher is recommended for south-eastern Wyoming. It is a strong-strawed barley, susceptible to loose smut.—P.M.

DENMARK, Statens Forsøgsvirksomhed i Plantekultur. I. Medd. 394. Artsforsøg med Vaarrug, Byg og Havre 1943-46. [**Trials with spring rye, barley and oats 1943-46**] II. Medd. 395. Forsøg med Havresorter 1943-46. [**Trials with oat varieties 1943-46**] III. Medd. 397. Forsøg med Bygsorter 1943-46 [**Trials with barley varieties 1943-46**] *Tidsskr. Planteavl.* **51.** 723-8 and 730-3. 1947. **117**

I. The object of the trials was to investigate the value of spring rye; it was compared with barley and oats both in pure plots and in mixture. In some plots on sandy soil barley was highest yielding; a slightly lower yield was obtained from oats and the lowest yield from spring rye. In pure plots on low moor, oats gave the best yield, closely followed by barley; spring rye gave a considerably lower yield. In mixture spring rye + Ørn oats gave the best yield both on sandy soil and low moor, but it is to be noted that the barley mixture included the later but slightly lower yielding Archer barley, while in the oat mixture the same variety was used as in the pure plots.

II. The trials were conducted on ordinary arable land, fen and moor with approved and new oat varieties (8 varieties in all). Borris Opus, Højer Nr. 40/7, Svaløf Staal, Svaløf Ørn, and Petkus Flämingstreue were included in all the trials. Abed Minor was not included in the trials on arable, where earlier it had given the lowest grain yield. Pajbjerg Rex and Borris Opus II were only included in the trials in 1945 and 1946.

Borris Opus was selected from Borris Stand. Of the 5 varieties included in all the trials Opus has given the highest grain yield on arable, but a lower yield on fen and moor.

Højer Nr. 40/7, which was selected from Højer Nr. 10 has given on arable and fen the same grain yield as Opus, but a slightly higher yield on moor.

Svaløf Staal was selected after crossing Svaløf Stjerne and Ørn. In trials on fen this variety gave the largest grain yield of all the varieties. On heavy clay humus soil and on low moor it gave 1 to 4 per cent larger grain yield, but in other trials on clay humus soil and on sandy humus soil it gave a correspondingly lower yield than Opus. Staal has stiff straw and ripens 1 to 2 days earlier than Opus.

Svaløf Ørn has given approximately 2 per cent lower grain yield than Opus on clay and sandy humus soil, but has given the same or a slightly higher yield than that variety on fen and moor.

Petkus Flämingstreue has at most of the Stations given a lower grain yield on arable than Opus (3-8 per cent). Only on very light sandy soil has it given a 3 per cent larger yield.

Abed Minor was on fen and low moor about equal to Staal in grain yield ; on high moor it gave the highest yield.

Pajbjerg Rex was selected from a cross between Binder and Svaløf Ørn. On arable the variety has on the average given the highest yield of grain. On fen it comes directly after Minor.

Borris Opus II was selected from Borris-Stand. On arable it has given the same yield of grain as Opus. On low moor it has given the highest yield.

III. The number of barley varieties tested was 9, of which Abed Maja, Svaløf Freja, Øtofte L. 64, Alfa, Abed Rigel and Weibull's Balder were included in all the trials, while Svaløf Ymer, Lenta and K.V.A.L. were tested only in the 1945-1946 trials.

Of the varieties which had been tested in all the trials, Abed Maja on the average of all the stations gave the highest yield, 46.0 hkg. grain per ha., next followed the 4 varieties Svaløf Freja, Øtofte L. 64, Alfa and Abed Rigel with almost identical yield, 45.2—44.8 hkg. grain and last Weibulls Balder with 44.3 hkg. grain per ha. In the 1945, 1946 trials Svalöf Ymer gave 0.5 and Lenta 0.2 hkg. more grain than Maja. Rigel has the stiffest straw, Balder, Freja and Lenta follow, and Øtofte L. 64 and Alfa have the weakest straw of the varieties tested. K.V.A.L. has given the lowest yield of grain and straw.—R.P.J.

DOBBEN, W. H. van Verslag van de in 1940 en 1941 door de Rijkslandbouwconsulenten genomen veldproeven met wintergranen. [**Report on the field trials of winter cereals conducted by the Netherlands Agricultural Advisers in 1940 and 1941.**] *LandbVoorlDnst Med.* No. 31. 1942. pp. 68. [Cent. Inst. Agric. Res., Wageningen, Netherlands] **118**

Variety trials conducted under the supervision of twenty regional Agricultural Advisers and collaborators are described. The cereals tested were winter wheat, winter rye and winter barley, and findings are concerned with yield in different types of soil, with winter hardiness, earliness, quality, and the effect of manures and different cultural technique.—G.M.R.

DOBBEN, W. H. van Verslag van de in 1940, 1941 en 1942 door de Rijkslandbouwconsulenten genomen veldproeven met zomergranen. [**Report on the field trials of summer cereals conducted by the Netherlands Agricultural Advisers in 1940, 1941 and 1942.**] *LandbVoorlDnst Med.* No. 41. 1946. pp. 80. [Cent. Inst. Agric. Res., Wageningen, Netherlands] **119**

The trials were conducted by twenty Agricultural Advisers and collaborators in the various Netherlands regions, the material consisting of different varieties of summer wheat, oats, and summer barley. Findings are concerned mainly with the performance of the varieties (grain yield, straw yield, resistance to disease, earliness of development and maturity, stiffness of straw) in the different types of soil (clay, sand) and as affected by sowing date, seeding rate, the application of nitrogen, etc. —G.M.R.

PENNSYLVANIA Agricultural Experiment Station. Bull. 501. **Small grain variety tests, Pennsylvania, 1941-47.** By *J. B. Washko.* 1948. pp. 21. **120**

Yield data are recorded in variety trials on wheat barley and oats grown in representative districts of Pennsylvania. Recommended varieties are : winter barley, Wong, Kentucky No. 1, Tennessee Winter ; winter wheat, Thorne, Nured, Nittany, Purkof (north region only) ; spring oats, Clinton, Ajax (susceptible to crown rust).—K.J.S.

FENAROLI, L. **Hybrid corn program in Europe.** *Food Agric.* No. 5. 358-61. 1948. [Corn Exp. Sta., Bergamo] **121**

Italian field tests with hybrid corn imported from the United States are described. The hybrid corn varieties imported proved to have a good grade of adaptability to the Italian environment, with yields even higher than the average yields obtained in the American Corn Belt. Eighty-six per cent of the hybrids tested at Bergamo, 83 per cent of the hybrids tested at Aquileja, 80 per cent of the hybrids tested at Brembio and 62 per cent of the hybrids tested at Savigliano gave a yield higher than the one local standard variety adopted in each area as a comparison.—G.M.H.

GEORGIA, Coastal Plain Experiment Station. Mimeo. Paper. No. 52. **Release of Dixie 18 hybrid corn.** 1948. pp. 3. [Mimeographed] **122**

Data is presented on Dixie 18, a yellow-grained hybrid adapted to the Coastal Plain. Results of tests covering a wide range of conditions indicated superior yield and standing ability. It compares equally with Wheatley in weevil resistance. Although tall, Dixie 18, has a good stalk and root strength to resist lodging.—P.M.

WAGENINGEN, Rijksinstituut voor Rassenonderzoek van Landbouwgewassen. Bericht over rassenkeuze No. 50. Maïs, 1948. [**Report on selection of varieties. No. 50. Maize, 1948.**] *Maandbl. LandbVoorlDnst* **5.** Suppl. 12. p. 2. 1948. **123**

The maize-growing area of the Netherlands, approximately 11,000 acres, is occupied mainly by early varieties of the flint type. The grain yield of six varieties in 1946 and 1947 is compared, and descriptions are given of these and one other variety.—G.M.R.

MALIANI, C. Studio comparativo sui granoturchi coltivati nelle Venezie nel 1942. Comunicazione preliminare. [**Comparative study of the maize varieties cultivated in the Venetian regions in 1942. Preliminary communication.**] *Genet. Agrar.* **1.** 95-102. [English summary, p. 102.] 1946. **124**

(See *Plant Breed. Abstr.* 16. No. 4. Abst. 1743).

CELESTRE, M. R. Ricerche citologiche e genetiche su un granoturco nano elettrogenito. [**Cytologic and genetic researches on dwarf maize produced electrogenetically.**] *Genet. agrar.* **1.** 204-17. [English summary p. 217.] 1947. **125**

See *Plant Breed. Abstr.* 17, No. 4, Abst. 1641.

PAGLIUGA, V. "Trentinella di Pescara" granoturco per terre siccitose. ["**Trentinella" of Pescara, a maize for arid soils.**] *G. Agric.* **58.** 3. 1948. **126**

This maize variety, particularly suitable to the hilly, arid soils of Central and South Italy, has a vegetative period of 100-110 days. Because of its small vegetative development 5-6 plants per sq. m. can be grown, the maximum height being 1.50 m. Each plant bears one, seldom two ears. The ear is narrow and long, with 8 rows of grains, each row having an average of 35 grains.—E.B.

MEGEE, C. R. El "proso": un mijo para grano. [**Proso A, grain millet.**] *Granos* **11.** Nos. 10-12. 75-8. 1947. **127**

Panicum miliaceum. Spanish version by A. Luces of Mich. State Coll. Ext. Bull. 231, 1941.—G.M.R.

SCOTLAND Department of Agriculture. Leafl. No. 1. (New Ser.). **Oat varieties.** By *A. S. B. Wilson.* 1948. pp. 8. **128**

Varieties recommended for milling are: Victory, Star, Onward, Eagle for growing on low-ground areas in a state of medium to high fertility; for growing on higher ground of average to high fertility, Early Miller and Ayr Commando; for high ground of average to low fertility, Black Tartarian and Potato Oats. Non-milling varieties suited to a wide range of fertility, soil and climate are: Yielder, Marvellous, Supreme and Golden Rain II; Sandy and Bell are suited to northerly and moist climate districts of medium to low fertility and liable to high winds. The chief characters of each variety are stated.—K.J.S.

JONES, E. T. **Winter oats.** 1948. pp. 28. [Welsh Plant Breed. Sta. Aberystwyth] **129**

"It would be true to say that within the last decade greater strides have been made in this country in the improvement of winter oats by breeding than in the improvement of any other cereal crop." A brief discussion of breeding investigations conducted at the Welsh Plant Breeding Station follows with notes on the winter-hardy variety Aberystwyth S.81, which has stronger straw than that of Grey Winter and a grain-yielding capacity higher by 10 to 12 per cent, and the still more productive varieties Aberystwyth S.147 and Aberystwyth S.172 more recently introduced with yield improvement varying from 15 to 30 per cent. according to the fertility level of the field. The variety Aberystwyth S.172 is well suited to rich and fenland soils, and Aberystwyth S.147 to soils of good and average fertility.—G.M.H.

WYOMING Agricultural Experiment Station. Bull. 284. **Varieties of oats for Wyoming.** By *D. L. Klingman.* 1948. pp. 23. **130**

Information is given on improved oat varieties now available. The following are recommended for irrigated land: Bannack, a high-yielding, mid-season smut-resistant variety; Overland, which is a short, strong-strawed variety, yielding slightly less than Bannack; Markton, producing good yields of high quality grain, is mid-season, resistant to smut and is also adapted to dry-land; Victory, susceptible to smut and is a tall, high-yielding, mid-season variety; Colorado 37, mid-season, tall, producing kernels of high weight per bushel. This variety is susceptible to smut and seed should be treated. Apart from Markton, another variety, Brunker, is recommended for dry-land. It matures early, is drought and smut-resistant but has weak straw.—P.M.

PESOLA, V. A. Rukiin jalostuksesta ja sen tuloksista Jokioisissa. [**Rye breeding and its results at Jokioinen.**] *Maatalous ja koetoiminta* **2.** 97-110. 1947. **131**

The author gives an account of the rye breeding work carried out by the Plant Breeding Department of the Central Agricultural Experiment Station, Jokioinen, Finland. As rye is the country's most important bread cereal it is of value to produce new, winter hardy and productive varieties with stiff straw. Winter hardiness in, for example, the German and Swedish varieties is so low that they are not worth cultivation in the climate of Finland. The article describes the results of trials of two new Jokioinen rye varieties, namely, Pekka (the Finnish Härmä × Svalöf Steel), which was released for sale in 1941, and Onni (Svalöf Star × an indigenous rye), which came out in 1945.—O.V.

CAMBRIDGE, National Institute of Agricultural Botany. **A description of the recommended varieties of wheat and barley.** By *F. Earnshaw*. pp. 79. **132**

Instructions given to N.I.A.B. Inspectors for identifying recommended varieties of wheat and barley are made generally available through this bulletin. The characters used in classifying wheats are: straw characters, ear characters, the glume, the terminal spikelet, the rachis and the grain. These are described in detail for 22 varieties. In barley where the main requirement is for malting and brewing classes, the characters for use in identification are: fertility of the spikelet, ear density and minor characters of the ear and grain. These are discussed for 10 main varieties.—K.J.S.

BOTTAZZI, G. B. Il centro di conservazione di ceppi agrari. [**The centre for the maintenance of agricultural strains.**] *Genet. agrar.* **1.** 254-75. [English summary p. 275.] 1947. **133**

See *Plant Breed. Abstr.* 17, No. 4, Abst. 1600.

GIOVANNELLI, B. Osservazioni sui frumenti perenni russi *Triticum orientale* × *Agropyron glaucum* e *T. lutescens* 062 × *A.gl.* e loro derivati da incroci. [**Observations on Russian perennial wheats** *T. orientale* × *A. glaucum* and *T. lutescens* **062** × *A. Glaucum* **and their derivatives from crossing.**] *Genet. agrar.* **1.** 125-9. [English summary, p. 29.] 1947. **134**

Observations were made on 4 specimens of perennial wheats of Russian origin, 3 being represented by one ear per type and the fourth by a few grains. One ear, belonging to a hybrid of *T. vulgare* × *A. elongatum*, contained no grains. On cultivation, the spring form referred to as hybrid 611 (wheat × Agropyron) showed resemblance with an ordinary wheat and no signs of perennial habit. The last two forms (as per title) bore ears with ripe grains, after which a new set of ears formed from secondary tillers and then the plants died. These hybrids, however, are of no practical value in the Italian environment, being late maturing and very low yielding, but have been widely crossed with Italian wheat varieties. The work is in progress and definite results are not to be expected for some time.—E.B.

DIONIGI, A. Nuovi indirizzi della genetica. 1. Il carattere "precocità." 2. Il frumento "Nazareno Strampelli." [**New turns of genetics. 1. The character "earliness." 2. The wheat variety "Nazareno Strampelli."**] *G. Agric.* **58.** No. 32. p. 5. No. 33-4. p. 3. 1948. **135**

After having explained the character "earliness" in relation to summer spring and autumn varieties, the author announces the creation of a new autumn variety, the "Nazareno Strampelli I" that spikes 8-12 days before the "Mentana," so far the earliest among autumn varieties.—E.B.

CONTI, G. Il problema granario appulo-lucano. Risultati di un ventennio di selezione. [**The wheat problem in Puglia and Lucania. Results of twenty years' selection.**] *Ann. Sper. agrar.* **2.** 319-56. [English summary, p. 355.] 1948. **136**

Cultivation of highly productive varieties cannot be extended in Southern Italy because of low humidity during critical periods, late frosts and relatively small amount of organic matter in the soil. In such conditions, races that economise water resources by a slow growth during winter, avoid late frosts by a late flowering, and rust by late ripening, are required. The principal varieties obtained through selection, which have now replaced the previously grown local varieties, are described. Among varieties of soft wheat are: "Maiorica 47" for hilly grounds, "Maiorica 66" for red soils, "Maiorica 68" for not too superficial soils, "Risciola 44" for deep soils, "Rossetta 55" for low areas exposed to frost and sun scald, "Bianchetta 83" for the Foggia plains, "Clara 122" for soils of medium fertility, and "Marzuolo 293" for late sowing. Among varieties of hard wheat are: "Sardo 40," "Sardo 45" and "Ricco 28" for the best soils, "Capinera 179" and "Rossarda 213" for the Salentine peninsula (Lecce), "Azizia 301" for not too dry soils, "Azizia 302" for drier soils, and "Triminia 294" for late sowing.—E.B.

TORDESILLAS, F. S. Iniciación al estudio del rendimiento unitario y calidad de los trigos en relación con el regimen de humedad. [**Introduction to the study of yield per unit and quality of wheat in relation to the humidity régime.**] *Bol. Inst. Invest. agron.* No. 18. 181-8. [English summary, p. 186.] 1948. **137**

This is an introduction to a series of trials to be carried out with the object of studying the influence of humidity and of different quantities of manure on yield and on milling and baking qualities of wheat. So far only an indication and no definite conclusion has been reached. It seems that the best results are obtained with a high humidity in the soil during the critical period of plant life that goes from shooting to heading, with the addition of potassium chloride.—E.B.

SCOTT, R. C. **New wheat varieties and disease resistance.** *J. Dept. Agric. S. Aust.* **51.** 527-31. 1948. **138**

The origin and more important characteristics of certain new rust-resistant wheat varieties are described. The varieties are Warigo, Glen Wari, Gabo, Kendee, Celebration, Charter, Frisco, Yalta, and also Bungulla, Koorda, Insignia, Pinnacle, Regalia, Dirk, Javelin, and Scimitav. The latter group was bred by the Victorian and Western Australian Departments of Agriculture, and Roseworthy Agricultural College in South Australia.—G.M.H.

FRANKEL, O. H. **A new high-yielding wheat variety-WRI-Yielder.** *N. Z. J. Agric.* **76.** 221-2. 1948. **139**

This variety has been produced by the Wheat Research Institute of the N.Z. Dept. Sci. Ind. Res. The prefix WRI- will be used for all new varieties produced by the Institute in future. WRI-Yielder is recommended mainly for Canterbury and North Otago, but not for the Dreadnought area in the south, nor for Marlborough, South Otago or Southland where it is likely to lodge. On all the medium-heavy, medium and lighter land the variety is expected to give good yields, and in addition to its normal use as an autumn wheat, it promises well for spring sowing.—M.H.

REVUE de L'AGRICULTURE. Les semences canadiennes de froment de printemps. [**Seed of Canadian spring wheat.**] *Rev. Agric. Bruxelles.* **1.** 42-3. 1948. **140**

Since supplies of Belgian wheat seed were inadequate to meet requirements early in 1947, Canadian seed, " Manitoba ", was used. There were several sub-varieties, the growth habits of which are described. These wheats germinated well, matured early and yielded between 2500 and 3500 kg. per ha. according to the district. It is admitted that the summer of 1947 was exceptionally favourable for wheat production.

Another variety " Huron " also grew well and matured earlier than the local varieties. It yielded 2000 to 2500 kgm. per ha. according to the district. This was below the normal yield of 3000 kgm.—D.B.

UNITED STATES Department of Agriculture. Circ. No. 783. **Effects of awns on yield and market qualities of wheat.** By *C. A. Suneson, B. B. Bayles* and *C. C. Fifield.* 1948. pp. 8. **141**

Awnless Baart and Awned Onas, were derived by reciprocal back crossing from a cross of Baart × Onas. They were compared with original awned Baart and awnless Onas, and results indicated that yield, test weight and kernel weight, under irrigated and semi-arid conditions, were superior in the awned forms. Derived awn types were similar to the parental strains in chemical, milling and baking quality.—P.M.

WYOMING Agricultural Experiment Station. Bull. 282. **Wheat varieties for Wyoming.** By *D. L. Klingman.* 1948. pp. 27. **142**

More profitable returns will result when the older varieties such as Marquis, Ceres, Turkey and Canred are replaced by the new improved varieties. Thatcher, Pilot and Onas are spring wheat varieties which are recommended. Thatcher succeeds under irrigated and dry-land conditions. Giving good yields, it has a strong straw and is resistant to stem-rust. Pilot, a high-yielding variety does best on dry-land. It is resistant to stem and leaf rust and to bunt. Onas is recommended to growers of wheat for feed. It produces a high yield and has short stiff straw. The seed should be treated to prevent bunt or stinking smut.

Cheyenne and Nebred are the recommended winter wheats. The former has stiff straw, short erect heads, stools heavily and produces high yields ; the latter, which in appearance is similar to Turkey, is more winter-hardy and is resistant to many races of bunt.—P.M.

GRANOS. Variedades de trigo aconsejadas por el Tribunal de Fiscalización de Semillas para la siembra del año 1946. [**Wheat varieties recommended by the Seed Certification Tribunal for sowing in 1946.**] *Granos* **10.** Nos. 10, 11 and 12. 3-9. 1946. **143**

The wheat growing region of Argentina is mapped and divided into 6 sub-regions, for each of which tested varieties are recommended, with notes on the date of sowing in each case.—G.M.R.

CARDIELO, R. N. Comportamiento pergaminense de variedades de trigo en el año agrícola 1945-46. [**Behaviour of wheat varieties in the Pergamino region, 1945-46.**] *Granos* **10.** Nos. 10, 11 and 12. 33-5. 1946. **144**

An account for radio transmission of wheat varietal trials in the Pergamino region of Argentina. Points stressed are the necessity in some cases of better tillage and cultivation and in others the use of better, preferably certified seed.—G.M.R.

MANEIRO, V. La acción oficial y privada en el mejoramiento de la producción triguera del país. [**Official and private action in the improvement of wheat growing in Argentina.**] *Granos* **10.** Nos. 7-9. 31-2. 1946. [Dir. Cereales, Lino y Forrajes, Min. Agric., Argentina] **145**

A radio address. Practically the whole of the

Argentine wheat belt is sown to pedigree seed. The address gives a short account of the different varieties concerned and their breeders.—G.M.R.

JEALOTT'S HILL, Imperial Chemical Industries Ltd. Bull. No. 6. **Nitrogen for cereals. The response of cereals to increasing rates of nitrogen fertilization.** By *D. J. Halliday*. 1948. pp. 38 **146**

Accumulated yield data are presented from nitrogenous fertilizer experiments carried out on farms and research stations in Great Britain within 100 years. Wheat and barley grown continuously (at Rothamsted) have produced high yields with dressings of 5 cwt. S/A annually, other nutrients being adequate. With wheat grown in rotation in various districts there is usually an economic response of 2.4 cwt. of grain and 4.8 cwt. straw to 1 cwt. S/A per acre (23 lb.N); the average response to 2 cwt. S/A is 4.6 cwt. grain and 9.9 cwt. straw. Nitrogen equivalent to 1 cwt. S/A applied in spring gave an average increase of 2 cwt. grain as compared with 1.1 cwt. grain from an equivalent autumn nitrogen dressing. Barley yielded an average of 2.6 cwt. grain per cwt. of S/A applied up to 4 cwt. The nitrogen content of malting barley may however be raised unduly by rates exceeding 1-1.5 cwt. S/A or its equivalent. A high nitrogen level in feeding barley is desirable. Nitrogen should be applied to spring and autumn barleys in spring.

Oats gave an average response of about 3.4 cwt. grain for 1.25 cwt. of S/A. The amount of nitrogen that can safely and profitably be applied to cereals depends on soil, climate and cultural conditions. Varieties recommended as giving a good response to N without lodging are:—wheat: Little Tich, Little Joss, Yeoman, Bersée, Jubilee Gem, Iron III, Holdfast. Barley: Kenia, Maja, Abed-Kenia, Oats: S172, Aggregate 1337, Elder, Yelder, Pure Line Potato, Potato No. 7, Sonas Marvellous, Glasnevin Ardri I.

The evidence indicates the great increase in crop production attainable on exisiting acreages under cereals.—K.J.S.

ROBERTSON, I. S., and COOK, R. L. **Efficiency in the use of fertilizers for corn.** *Quart. Bull. Mich. agric. Exp. Sta.* **30.** 374-9. 1948. [Michigan Agric. Exp. Sta.] **147**

A survey of results of fertilizer trials on maize in Michigan has in general revealed an inappreciable response to complete fertilizer not attributable to high soil fertility. In a rotation which exhausts soil nitrogen supply, significant increases were obtained over 3 years for an 8-8-8 mixture. Maize did not respond to fertilizer applied to the preceding lucerne crop. Placement trials showed consistent and significant increases in maize yield when the fertilizer was placed in bands below and to the side of the seed. Ordinary fertilizer attachments to maize planters place the fertilizer in 2 bands level with or above the seed.—K.J.S.

GARNER, H. V. **Top dressing wheat.** *Fmg* **2.** 268-72. 1948. **148**

A discussion of manurial treatments leads to the conclusion that nitrogen is the main manurial factor for yield in wheat. Normally direct applications of quick-acting nitrogenous fertilizers are required and taken with the choice of suitable varieties thus forms one of the soundest ways of increasing wheat output in this country. The nitrogenous dressings are effective if applied at any time between autumn sowing and the middle of May.—G.M.H.

DUNNE, T. C., and THROSSELL, G. L. **Responses of wheat to copper and zinc at Dongara.** *J. Dep. Agric. W. Aust.* **25.** 43-6. 1948. **149**

When copper and zinc were used individually with superphosphate the yields showed statistically significant responses. There was a more striking increase in yield when zinc and copper were used together with superphosphate.—G.M.H.

PAN, C. L., and KUNG, P. **Fertilizers and the agronomic characteristics of wheat and rape.** *Nung Pao* **8.** 78-87. 1943. [Received 1948] **150**

Experiments were conducted in Hunan in 1937-8. N,P, and K fertilizers were found to affect various agronomic characteristics of wheat and rape in addition to yield. Most marked effects were shown by N, less marked by P and least by K fertilizers.

In wheat, N gives most luxuriant growth, deep coloration, more tillers, taller plants, and consequently higher yield in both grain and straw. Over fertilizing with N results in an increase in diseases and lodging and decreases grain weight. P fertilizer increases growth to a less extent and causes less disease and lodging and gives higher grain weight, so that the total yield is comparable to that of N fertilization. In addition P hastens tillering and ripening. K increases yield only slightly and is without any significant effects on growth. Combined N and P fertilization is satisfactory in all respects except lodging.

In rapeseed, N increases growth, yield, coloration, number of inflorescence per plant and number of seeds per silique. It delays ripening. P behaves similarly but does not delay ripening. K gives no significant results. Combined N and P fertilization gives higher yield and more inflorescence than each fertilizer alone. It shows no detrimental effect and is ideal for rape.—H.C.Y.

MALCORPS, G. La moissonneuse-batteuse et ses possibilités d'utilisation en Belgique. [**The combined harvester-thresher and the possibilities of its use in Belgium.**] *C. R. Acad. Agric. France* **34.** 275-9. 1948. [Univ. Louvain, Belgium] **151**

The following subjects have been investigated when using the combined harvester-thresher: equilibrium between the relative humidity of the air and moisture of the cereal; the comparative climatology of countries using the combined harvester-thresher; the relationship between hour of day of cutting, temperature of the air, humidity of the air and moisture content of the grain. The data given apply to cereals.—D.B.

KEELER, A. H. **The engineering development of a light, two-row tractor-mounted corn picker.** *Agric. Engng* **29.** 197-200. 1948. [Ch. Eng. East Maline Works, Int. Harv. Co. East Molline, Ill.] **152**

An account is given of the International Harvester No. 24 picker. It is a light, two-row, tractor-mounted machine which can be easily attached and detached from the Farmall "H," "M" or "MD" tractors. Illustrations indicate the details of the design. The following adjustments are noted: (1) an adjustable tie bar that permits setting the gathering and snapping units to the proper spacing to accommodate varying row widths of corn planting. The adjustment covers a range of row widths from 35 to 44 inches. (2) A snapping-roll adjustment on the outside of each unit making it possible to quickly and easily adjust the snapping roll relation to suit field conditions. (3) A chain extending from the tractor frame to the picking units controls the relationship of the picking units to the ground. The length of this chain can be easily adjusted upon entrance to the field. (4) A convenient adjustment for correct field operation is the range of flotation of the centre and two outside dividers, which are easily adjusted to coordinate with the relation of the two picking units to the ground. (5) The sprockets on either end of the main drive jockshaft can be changed to suit the speed at which the machine may be efficiently operated.—P.M.

SACK, H. **Weed control in grain fields with the flexible harrow.** *Agric. Engng* **29.** 352 and 354. 1948. **153**

A flexible harrow is described, which consists of 4 rows of heavy, 4 rows of medium and 5 rows of light tines. It has no rigid frame, being linked together from single members of round spring steel, each tine meeting the soil with its own weight, independently of any undulations of the surface. The heavy tines have diamond shaped points and are constructed from 3/8 in. spring steel, each tine weighing 1.5 lb.; the medium tines are eliptically pointed, of 5/16 in. diameter and weigh 1.1 lb., and the light ones with rounded points are of 1/4 in. diameter, weighing 0.75 lb. each.

The harrow can be used either with a tractor or horse. It is possible for one man to harrow a large area in a short time, so the best weather, plant and soil conditions can be used for operation of the implement.

Besides its use in grain fields, its use in potato, beets, beans and other legume fields, and in pastures is described.—P.M.

BERWICK, E. J. H. **Interim report on exploratory investigations into the mechanical cultivation of padi.** *Malay. agric. J.* **31.** 20-5. 1948. **154**

A review is given of the conclusions drawn from investigations into the mechanical cultivation of both wet and dry padi cultivation in Malaya in 1947.—G.M.H.

SIMPSON, H. J., and HARTLEY, C. W. S. **Investigations in to the mechanical cultivation of wet padi on coastal clays in province Wellesley.** *Malay. agric. J.* **31.** 26-33. 1948. **155**

Details are given of investigations carried out on wet padi areas at Lahar Yoi and Kepala Batas with certain available tractors and implements. The investigations were conducted as alternate wet and dry periods were experienced. On padi lands that dry out during the off-season it is possible to cultivate mechanically during that period and to bring the land to a fair tilth under dry conditions or into a condition fit for transplanting under wet conditions. Advantage of this state could only be taken if drilling in the former case and transplanting in the latter can be followed by the presence of adequate water either from rainfall or controlled supply.

The Fordson Major proved more successful than the 'Caterpillar' D.4 and it is recommended that all further work should be confined to this machine until the smaller 'Crawler' types arrive. —G.M.H.

CURRY, J. R. **Investigations into the mechanical cultivation of wet padi on coastal clays in the state of Pahang.** *Malay. agric. J.* **31.** 34-6. 1948. **156**

Brief notes are given of the experience gained in the problems of mechanically cultivating padi land on the coastal clays in Pahang. A rubber-tyred tractor was entirely unsuitable—it could not grip the ground even when the land was at its driest. Mould-board ploughs were unsuitable on land carrying a strong grass growth but they could plough land with short grass quite satisfactorily. Consequently trial work was confined to ploughing with metal-wheeled tractors and disk ploughs. Mechanical breakdowns were frequent and new and old buffalo wallows were a constant source of trouble because they were not always detectable.

When the surface of the land was dry a full uninterrupted day's work could be performed, one Fordson tractor with normal spiked, steel wheels ploughing a maximum of 8 acres in an 8-hour day. Performance could be reduced to as low as 4 acres per day on a wet surface, fuel consumption remaining the same. When the land became too wet for tractors equipped with normal wheels, two sets of rear wheels were fitted on one tractor. Thus equipped, with double width driving wheels " the tractors performed prodigious feats and under conditions in which a man walked up to his knees in mud and water, 4 acres could be ploughed in 8 hours."—G.M.H.

ALLEN, E. F., and BEWLAY, E. W. **Investigations into the mechanical cultivation of wet padi on peat soils in the state of Perak.** *Malay. agric. J.* **31.** 37-43. 1948. **157**

A detailed account is given of a programme designed to study the mechanical cultivation of wet padi on peat soil in the state of Perak. The items in the programme included clearing a stock of all timber and stumps and hand planting it with padi so that a large area should be available for mechanical harvesting trials early in 1948; investigating the possibilities of mechanical removal of stumps and buried timber; cultivating the dry land with available machines and implements; and testing the possibility of sowing by drills. The various disadvantages of the available machines for clearing, stumping, cultivation and drilling are listed.—G.M.H.

MALAYAN AGRICULTURAL JOURNAL. **Investigations into the mechanical cultivation of wet padi with horticultural tractors.** *Malay. agric. J.* **31.** 44-6. 1948. **158**

Results are given of a series of tests with horticultural tractors. The tests were organized on coastal clays, on peats, on river alluvial and quartzite soils.—G.M.H.

SOPER, J. R. P., and MARSHALL, F. R. **Investigations into the mechanical cultivation of dry padi on cleared land.** *Malay. agric. J.* **31.** 47-51. 1948. **159**

This is an interim account of the costs and difficulties encountered in growing dry padi by mechanical means. Except that it is possible to prepare the land and drill dry padi at a reasonable cost, no definite results can yet be drawn from the conclusions.—G.M.H.

SIMPSON, H. J., and KENDALL, T. A. **Investigations into mechanical stumping and cultivation of dry padi on filled rubber land.** *Malay. agric. J.* **31.** 52-6. 1948. **160**

An account is given of the costs and difficulties encountered in stumping, laland eradication and preparing old rubber land for growing dry padi by mechanical means. With suitable mechanical equipment, stumping and clearing can be done cheaply and more efficiently than by the usual hand methods.—G.M.H.

ARKANSAS Agricultural Experiment Station. Bull. 474. **The operation of rice driers in Arkansas, 1946.** By *O. J. Hall.* 1948. pp. 34. **161**

Combines for rice were introduced into Arkansas in 1943; in 1946 over 7 million bu. or 50.1 per cent of the total Arkansas crop were dried. The construction of the Berico, Hess, Unipass and Ellis driers is described. In the Berico and Hess continuous-flow types, a column of rice moves down through retaining screens and racks during which time heated air is blown through the rice. The rice moves through the column in 20 to 30 minutes. It is then stored for possibly 2 days and put through the drier again to remove further moisture. The first drying reduces the moisture content from about 23 per cent to 17 or 18 per cent and the second brings it down to 15 or 16 per cent. A third drying reduces the moisture to 14 per cent. Drying in one process causes uneven drying, and this affects the milling process. The Unipass is a batch-type drier. The driers used natural gas when available.—K.J.S.

DEXTER, S. T. **A colorimetric test for estimating the percentage moisture or the storage quality of farm products or other dry materials.** *Quart. Bull. Mich. agric. Exp. Sta.* **30.** 422-6. 1948. **162**

The test is based on the fact that the crystal faces of a dry chemical absorb sufficient moisture to bring about colour reactions with other chemicals before becoming observably wet. The chemicals selected for absorbing water are sodium chloride and potassium thiocyanate. In contact with sodium chloride, anhydrous ferric ammonium sulphate and potassium ferrocyanide will give a sharp colour change when shaken with wheat samples at 14 per cent and 15 per cent moisture respectively and are sensitive to moisture ranges of 12—16 per cent. Similarly the use of potassium thiocyanate and ferric sulphate gives indications of moisture contents ranging from 8 to 12 per cent. —K.J.S.

OXLEY, T. A. **Farm-stored grain.** *J. Minist. Agric.* **55.** 197-200. 1948. [Pest. Inf. Lab., Slough] **163**

Some " first aid " suggestions are given for those who have insufficient suitable storage space for combine-harvested grain. Harvesting should be postponed until about a fortnight after the crop would be judged fit for reaping, and binding and cutting should be postponed until the ears are thoroughly dry, even if this means waiting until noon or later. If a grain drier is available this should be operated as efficiently as possible. Because of the ventilation they give bags are preferable to ordinary bulk storage if damp grain must be stored.

Drying by admixture is sometimes possible with small quantities of unusually damp grain. This is done by mixing it intimately with a larger quantity of dry grain or some other absorbent material which can subsequently be removed. Bin ventilation and drying in the bin are also discussed.—G.M.H.

VEENBAAS, A. Verslag van een pel- en kwaliteitsonderzoek bij zomer- en wintergerstrassen in 1942. [**Research on pearling properties and quality of summer and winter barleys in 1942.**] *Med. nat. Com. Brouwgerst* 1946. No. 12. 165-93. **164**

The qualities desired in barleys for pearling are described, together with the effect of various factors on the quality of the pearl barley produced. Differences in the soil on which the crop was grown caused greater differences in the product than did varietal differences.—From *Plant Breed. Abstr.* 18. Abs. 936. 1948.

VALLE, O. Pikatutkimus kesän 1947 viljasadon laadusta. [**Preliminary report on the quality of the 1947 cereal crop.**] *Koetoiminta ja Käytäntö* 1948. No. 1. pp. 4. [Professor, Cent. Agric. Exp. Sta., Tikkurila, Finland] **165**

The quality of cereals in Finland (winter wheat, spring wheat, rye, barley and oats) has been inspected according to a uniform plan since 1944. The whole grain trade is concentrated in the State Grain Company, and, on purchase, the moisture content, hectolitre weight, purity etc. of grain are taken into consideration. For the normal price the following quality is requisite: moisture, 15.1 to 16.0 per cent for all cereal species; hectolitre weight (in kg.), 66.1 to 72.0 for rye, 76.1 to 78.0 for wheat, 60.1 to 65.0 for barley and 51.1 to 53.0 for oats.

Because of the good, dry harvest weather the quality of the 1947 grain crop was very good: the average moisture content for rye was 14.7 per cent, for winter wheat 14.7 per cent, for spring wheat 15.8 per cent, for barley 15 per cent, and for oats 15.3 per cent. The hectolitre weight (in kg.) for rye was 72.8, for winter wheat 79.8, for spring wheat 80.0, for barley 66.7, and for oats 54.5.

Bromus secalinus was a weed seed very common in rye. *Claviceps purpurea* is recorded for rye, especially in that from south Ostrobotnia. Sprouting grains are very common in normal years because of rainy weather in August and September, but the content of such was very low in 1947, on an average highest in rye and winter wheat, and even then only 0.4 per cent. Because of the dry harvest weather in 1947, the content of broken grains was unusually high, and highest in rye with 6.1 per cent. —O.V.

VEIJOLA, T. Hehtolitranpaino viljan hinnanmääräämisperusteena. [**Hectolitre weight as a basis of judgment in the grain trade.**] *Maatalous ja koetoiminta* **3.** 169-89. 1948. [Nat. Inst. Tech. Res., Helsinki, Finland] **166**

In the Finnish grain trade, hectolitre weight is used as a basis for determining price. The author studied the effect of moisture and purity upon hectolitre weight in rye, wheat, barley and oats. As grain dries, hectolitre weight increases very perceptibly in wheat, rye, and also in barley. The increase is considerable until about 16 per cent moisture, after which there is less change in weight. In oats the change is irregular. Four diagrams illustrate the effect of moisture on hectolitre weight in the different cereals.

The degree of purity has a distinct effect on hectolitre weight. The greater the amount of chaff contained in a sample, the lower is the hectolitre weight. In wheat, with its high hectolitre weight, the effect of chaff is greater than in oats, for example, with a low hectolitre weight.

The author concludes that as moisture and purity are taken into consideration separately in determining the price of grain, the hectolitre weight is of no great practical value. Its use is defensible only in the wheat trade.—O.V.

DELLA GATTA, L. Influenza della varietà, del clima e del terreno sulla qualità del grano. [**Influence of variety, climate and soil on the quality of wheat.**] *Atti. Relaz. Accad. Pugliese Sci.* Nuova ser. Vol. 5. pp. 16. 1947. **167**

Account is given of investigations carried out at the Bari Agricultural Station during 1939-40, 1940-41, and 1941-42 into the influence that variety, climate and soil have on composition and, consequently on baking qualities of wheat. Seven varieties of soft wheat and three of hard wheat grown on five different localities are considered.—E.B.

VEIJOLA, T. Vehnän valkuaispitoisuudesta ja siihen vaikuttavista tekijöistä. [**The protein content of wheat and factors affecting it.**] *Maatalous ja koetoiminta* **3.** 120-35. 1948. [Nat. Inst. Tech. Res., Helsinki, Finland] **168**

As the growing of wheat in Finland has increased greatly since 1930, an increasingly important place has been given to this crop plant in the chemical study of cereals. Government inspection of cereal quality takes place at the National Institute of Technical Research (Valtion Teknillisen Tutkimuslaitos), Helsinki.

Studies have shown that there are great differences in the protein content of Finnish wheat in different years, even at one and the same place. At the Tammisto Plant Breeding Station, for example, the protein content (in the dry matter) of Diamond spring wheat fluctuated from 13.3 to 18.0 per cent in the years 1937 to 1947, being on an average 14.7 per cent. The variety which during the same period was richest in protein was the Finnish Tammi, its protein content being 7.4 per cent higher. The spring wheat with the lowest protein content was Diamond II.

Experiments in the application of nitrogenous fertilizers in increasing doses and at different times show that N has a certain effect upon the protein content of wheat, but it is not very marked. The causes of the great difference in protein content in the different harvest years are still undetermined.—O.V.

TELLES, Inés P. de S. Cantidad y calidad de la proteína y su función en la panificación. [**Quantity and quality of the protein and its function in bread making.**] *Granos* **10.** Nos. 10, 11, and 12. 19-20. 1946. [Dir. Cer., Lino y Forrajes, Min. Agric., Argentina] **169**

A radio address on the characters governing the panification value of wheat.—G.M.R.

MANUNTA, C. Sul colore delle farine. Studio comparato del contenuto in pigmenti delle farine di varie razze di Triticum coltivate in varie località. [**Flour colour. A comparative study of the pigment content of the flours from different *Triticum* races cultivated in different localities.**] *Genet. agrar.* **1.** 38-59. [English summary p. 59] 1946. **170**

[See *Plant Breed. Abstr.* 16, No. 4, Abst. 1719]

DIMIC, A. Il potere calorifico del grano in rapporto ai fattori biologici ed ambientali. [**Calorific power of wheat in relation to biologic and environment factors.**] *Ital. agric.* **85.** 335-40. 1948. **171**

Wheat returns are studied under the aspect of quality of the product. Quality of wheat is characterized by quantity and quality of the gluten, calorific power, etc. This study has been carried out on a number of wheat varieties of very different ecological characteristics. Results show that, in a same environment, calorific power varies from one variety to the other. For experimental purposes environment factors have been restricted to climate which influences calorific power of wheat with its four components: insolation, rain, temperature, and relative humidity. The "Turkey" variety grown in different countries of the world, in different environments, has shown small differences in calorific power, but this is due to a great extent to the fact that rain and temperature, the two principal factors, can have at the same time an opposite influence, thus attenuating the effects of their action.—E.B.

MANUNTA, C. Analisi cromatografica e spettroscopica dei pigmenti carotenoidi delle farine e studio comparato del contenuto in pigmenti delle cariossidi di varie razze di *Triticum* coltivate in varie località. [**Chromatographic and spectroscopic analysis of the carotenoid pigments of flours and a comparative study of the pigment content of the grains of various *Triticum* races cultivated in various localities.**] *Genet. agrar.* **1.** 167-86. [English summary p. 186.] 1947. **172**

[See *Plant Breed. Abstr.* 17. No. 4, Abst. 1621.]

MCCALLA, T. M., and DULEY, F. L. **Stubble mulch studies: effect of sweetclover extract on corn germination.** *Science* **108.** 163. 1948. **173**

The effect on germination and water extracts of several different plant materials, including sweet clover was studied. Sweet clover retarded germination of corn seeds, more so than did alfalfa, wheat straw or oat straw. From further experiments it would appear that the coumarin in sweet clover may be one of the substances that inhibit germination and growth of the corn seedlings.—P.M.

PENNSYLVANIA Agricultural Experiment Station. Leafl. 125. **Treat seed grain to get bigger yields and better quality.** By *R. S. Kirby.* 1948. pp. 4. **174**

Brief notes on the time and methods of treating seed of barley, corn, oats, rye and wheat are presented. Recommended materials are New Improved Ceresan, Ceresan M and Semesan Jr, Arasan and Spergen, copper carbonate and formaldehyde.—P.M.

CHEN, W., and HUANG, W. H. **Acidity and quality of stored rice.** *Fukien agric. J.* **8.** 10-5. 1947. **175**

Acidity of the dilute alcohol extracts of untreated and sun-dried rice was determined twice monthly during storage. Other qualities were determined a year later. Changes in acidity were quite varied but there was a general tendency of rising to a maximum and decreasing toward the end of the storage period. Acidity varied directly with the water content but bore no significant relation to the carbohydrate-protein ratio or the physical characters of the grains. Germination power followed the same changes as acidity and was always lower in the untreated, high-moisture grains. —H.C.Y.

MARCHETTI, M. Sulla capacità riproduttiva del seme in relazione alle sue dimensioni. [**On reproductive capacity of grains in relation to their size.**] *Ital. agric.* **85.** 343-4. 1948. **176**

Field trials have been carried out in order to test reproductive capacity of wheat grain of the

"Libero" variety having different size. Two sizes of seed obtained with different sieves have been employed. Higher yields (of 18 and 16 per cent) have been obtained with the small size seed, sowing two equal plots of land with the same quantity in weight of the two sizes and a third plot with a number of grains of the small size equal to that used for the large size (in this case using a smaller quantity in weight of small grain.) From this last test it is evident that the small size grain has a higher germinability and gives higher yields than the large one.—E.B.

WOLF, D. E., and ALGREN, G. H. **Pre-emergence control of weeds in corn with calcium cyanamide.** *J. Amer. Soc. Agron.* **40.** 568-70. 1948. **177**

Maize (var. U.S. 13) was planted in loamy sand and cyanamide broadcast immediately after planting. Seedlings emerged unharmed. Weeds including ragweed, pigweed, *Polygonum pennsylvanicum*, lambs-quarters, crabgrass and nutgrass were controlled effectively by 600 lb. of cyanamide per acre and the need for the first two cultivations was eliminated. Yields of maize were doubled by 300 lb. per acre dressings of granulated cyanamide. —K.J.S.

НАУГОЛЬНЫХ, В. Н. О стойкости листьев двудомных растений к ядовитым веществам. *Доклады Акад. Наук СССР.* Том 57. *No.* 4. стр. 403-6. 1947.

NAUGOLJNYH, V. N. [**Resistance of leaves of diclinous plants to toxic substances.**] *Doklady Akad. Nauk. SSSR.* **57.** 403-6. 1947. [Molotovsk State Univ.] **178**

The material of the tests comprised *Melandrium album* and *Rumex thyrsiflorus* growing in the Troick preserve, Čeljabinsk region. The former plant occurred as a weed in a sowing of wheat and oats on a black-soil area, and also in a solončak meadow overgrown with *Calamagrostis epigeios*, while the latter was collected from the Troick preserve and from the Botanical Garden of the above University. Tests were made of the effect on leaf epidermal cells of lactic acid. There is evidence that the acid has less effect on leaves of female plants, which are therefore considered more resistant than those of the male plants. A second experiment included observation on the effects of mercuric dichloride and formalin in addition to lactic acid. Leaves of different age from female plants of *M. album* were less affected by these substances than were those of male plants.—M.H.

GRIGSBY, B. H., and CHURCHILL, B. C. **Effect of 2, 4-dichlorophenoxyacetic acid on oats and barley varieties.** *Quart. Bull. Mich. agric. Exp. Sta.* **30.** 448-51. 1948. [Michigan Agric. Exp. Sta.] **179**

Oats and barley were sprayed when about 6 in. high with the sodium salt and ester of 2, 4-D at 3 rates of application. There was no visible damage to the crops at rates of 0.75, 1.5 and 2 lb. 2, 4-D equivalent per acre. These rates killed ragweed, mustard, yellow rocket and rough pigweed. Seedling clover was killed by all 2, 4-D treatments but not by Dow Selective weed killer (dinitro-compound). Neither weed killer reduced germination of barley; oats showed varietal differences in germination injury and this problem will be investigated.—K.J.S.

STAHLER, L. M. **Shade and soil moisture as factors in competition between selected crops and field bindweed,** (*Convolvulus arvensis.*) *J. Amer. Soc. Agron.* **40.** 490-502. 1948. **180**

If competition is for water alone, a crop such as rye will not impair the growth of bindweed. Where water and nutrient supply is ample, light is a limiting factor for bindweed and where selected crops form a canopy bindweed is suppressed. Autumn-sown rye or wheat following intensive cultivation, lucerne pre-eminently, millet, sorghum, soya bean and Sudan grass, planted at midsummer, maintain a sufficiently dense canopy above bindweed, but hemp and sunflowers are not suitable. Daily variations in shade value are given for the above crops.—K.J.S.

PERUGIA, Istituto di Agronomia generale e Coltivazioni erbacee dell 'Università. Ricerche sulle erbe infestanti in Umbria. Danni di alcune infestanti alla coltura del frumento. [**Researches on weeds in Umbria. Damage caused by some weeds to wheat cultivation.**] By *A. Grimaldi. Agricoltura ital.* **46.** 1946. pp. 28. **181**

Avena fatua (wild oats) and *Vicia sativa* (vetch) are predominant on other wheat weeds in Umbria. In 5-years' trials, the nature and amount of damage caused by these 2 weeds to wheat cultivation have been investigated. Literature on the subject is reported.—E.B.

SARASOLA, J. A., and CAMPI, M. D. Reacción de algunas cebadas con respecto a "*Rhynchosporium secalis*" en Argentina. [**Reaction of some varieties of barley to** *Rhynchosporium secalis* **in Argentina.**] *Rev. Invest. agric.* **1.** 243-60. 3 pls. 1947. [Inst. Fitotecnia, Min. Agric., Argentina] **182**

An account of inoculation experiments with a very large amount of material in 1946 and 1947. With few exceptions, most Argentine barleys are very susceptible to *Rhynchosporium secalis* and some varieties resistant in North America proved susceptible in Argentina. Eight varieties are listed, which besides possessing other valuable characters, are resistant to the fungus. Another five varieties, still under trial, are probably equally resistant. The reaction of some varieties of wheat, rye and oats which were inoculated was negative. —G.M.R.

SORTEBERG, A. Mikronæringsstoffmangelsykdommer på planter. [**Diseases of plants due to deficiency of trace elements.**] *Medd. norske Myrselsk.* **46.** 79-90. 1948. **183**

In Norway deficiency of boron appears to be the most frequent cause of deficiency diseases. Liming increases appreciably the danger of boron deficiency. The work of Ødelien and Vidme is reviewed. Of cereals, barley suffered most severely from boron deficiency: wheat, rye and oats showed similar symptoms but the attack was less serious than in barley. In carrots the youngest leaves frequently became chlorotic and withered: with very heavy attacks the plants died in the seedling stage. Ødelien and Vidme also found that when the soil was watered to only 20 per cent of moisture capacity boron deficiency occurred more quickly and severely than when it was watered to 60 per cent of its moisture capacity.

Copper deficiency areas occur in particular along the coast in Sørlandet, Vestlandet and North Norway. Cu deficiency causes injury especially to oats, and also to barley, more rarely to wheat, and only very seldom to rye. Other crops which may suffer from lack of Cu are carrots, turnips and swedes. Manganese deficiency causes serious injury to oats: barley, wheat and rye are less severely attacked. Deficiency of iron has a harmful effect on oats and barley. Little is known about molybdenum deficiency in Norway: experiments conducted abroad indicate that this element is necessary for oats. Investigations (pot trials and field trials) were conducted by the State Agricultural Chemistry Station in Trondheim in which zinc was supplied to oats, barley, wheat and rye. In the pot trials the grain yield was larger when zinc was added in barley, wheat and rye. Barley without the addition of zinc was on the whole unable to produce ripe grain. The yield of straw was very large. In all these different cereal crops the plants were a lighter green colour without than with the addition of zinc. In the field trials which were carried out at Voll Experiment Station the addition of zinc increased the grain yield of barley and wheat.—R.P.J.

ANDRÉN, F. Höstsädens betning. [**Disinfection of autumn-sown grains.**] *Lantm. Svenskt Land.* **32.** 580. 1948. **184**

This year's harvest of autumn grain in Sweden is likely to be seriously attacked by *Fusarium* fungi. In 1947 *Ustilago tritici* was general in wheat and also barley, and has been noted this year too. Loose smut and also bunt now play a relatively small part economically from the yield point of view. But *Fusarium* attack, particularly seedling *Fusarium* and snow mould are of the greatest importance as yield reducing factors. When the attack is slight all the mercurial preparations have practically the same effect, but when the grain is severely attacked they show marked differences.

Trials conducted this year (1948) with a lot of autumn rye heavily attacked with *Fusarium* have yielded interesting results, fairly large differences in effect having been shown by the different preparations. Compared with untreated, which practically died out completely, Betoxin 61, Panogen and Aagrano showed very good stands. The older U.T. 1875 b, Certosan, Lunasan and Agrosan also gave good results, but not equal to the other three. Hormotan, of which the quicksilver substance has a growth hormone as its basis, has also proved relatively good. In this case the preparation was tested with different rates of seeding: 200, 150 and 120 kg. per ha. Judging by the results obtained hitherto, the lower rates of seeding show a better stand than the normal rate of 200 kg. It is, however, too early to express an opinion about the growth-promoting properties of the preparation. On the whole Hormotan appears not to have the same good fungicidal effect as, for example, the Swedish disinfectants.

With regard to the non-mercurial preparations such as Spergon, Phygon Cuprocide etc. it is quite obvious that these cannot compete with the mercurial preparations. This applies not only to loose smut of oats and stripe disease but also to snow mould and seedling *Fusarium.*—R.P.J.

GOIDANICH, G. Il ritorno della "malattia dei cereali." [**The reappearance of the "disease of cereals."**] *Italia agric.* **84.** 59-63. 1947. **185**

The 1895-6 disease of wheat, barley and oats in South and Central Sardinia caused great losses of crops. Symptoms were a general withering of the plants resulting in death of a great number and improductivity of the others.

On the same area (30,000 ha.) an identical disease occurred in spring 1946. It has been recognized as caused by *Fusarium culmorum.* Causes favouring the development of this parasite (which is a "soil inhabitant") were particularly unfavourable climatic conditions (heavy rains with relatively high temperature in March, in the early vegetative period) and decreased vitality of the plants in consequence of previous drought and decreased fertility of the soil because of lack of fertilizers.—E.B.

FORLANI, R. Sterilità in alcune graminacee e infezioni da *Claviceps* sp. [**Sterility in certain graminaceous plants and infection by *Claviceps* sp.**] *Genet. agrar.* **1.** 218-24. [English summary p. 224.] 1947. **186**

The greater susceptibility of rye to *Claviceps* *purpurea* in comparison with wheat is attributed to the fact that rye is open-pollinated while wheat is nearly always self-pollinated. It has been observed that some interspecific and intergeneric semi-sterile wheat hybrids, which have the glumes wide open during flowering, are attacked by *Claviceps*, while completely sterile hybrids are not attacked, although they also flower with open glumes. The author supposes that development of *Claviceps* spores is only possible after fertilization has taken place. Mention is also made of the principal hybrid and species of wheat and other Gramineae which were found parasitized in 1946.—E.B.

ROSELLA, M. Les piétins des céréales au Maroc. Les organismes que l'on rencontre le plus fréquemment. Les conditions qui facilitent ou qui provoquent l'attaque. [**Foot rot in cereals in Morocco. The organisms most frequently causing the disease and the conditions which facilitate or give rise to the attack.**] *C. R. Acad. Agric. France* **34.** 681-3. 1948. **187**

The most useful organisms causing this disease in Morocco are *Helminthosporium sativum* and *Ophiobolus graminis*. Of these, *H. sativum* is the more important, destroying the seeds or preventing development of the cereal. The pathogenicity of *O. graminis*, which invades both the root system and the base of the stem, is aided by the alternation of dry and moist periods, the former predisposing the plant to infection.

Mercuric salts are effective in disinfecting the cereal seeds. The disease should be combatted by improved cultivation of cereals and by manuring.—D.B.

JENKINS, W. A. **A root rot disease-complex of small grains in Virginia.** *Phytopathology* **38.** 519-27. 1948. [Virginia Agric. Exp. Sta.] **188**

This disease of cereals grown on sandy soil in rotation with tobacco is traced to the feeding habits of members of the meadow nematode group previously investigated on tobacco. It causes uprooting of plants during freezing and thawing in early autumn and late spring as well as in winter and results in considerable loss in stand. Control measures are not very certain, but soil fumigation with DDT and the development of cereal varieties which will root vigourously offer promise. Mercury fungicides are rather more effective than non-mercurials in reducing severity. Liming and phosphatic manuring appeared beneficial in fields examined in late autumn but the same fields were badly affected in spring. High nitrogen applications reduced severity during the first season.—K.J.S.

ARGENTINA, DIRECCIÓN DE CEREALES, LINO Y FORRAJES. Prevenga sus cultivos del ataque del "pulgón verde." [**Protect your cultures from attack by** *Schizaphis graminum* **Rond.**] *Granos* **10.** Nos. 10, 11 and 12. 40-3. 1946. **189**

Schizaphis graminum (Rond.) Blanchard (=*Toxoptera graminum* Rond.) has been a cause of very considerable damage to Argentine cultures of oats, barley, wheat, and to a slighter extent rye, in recent years. The wheat regions most affected are mapped. Measures for preventing attack are listed. They include the use of specially recommended varieties, to be sown at given times which avoid the epoch at which there is most risk of attack and little rainfall, and every form of cultivation which produces vigorous plants. Excessive grazing, where cereals are grazed, must be avoided.—G.M.R.

VALLEGA, J., and FAVRET, E. A. Royas y otros parasitos de los cereales en los valles andinopatagónicos. [**Rusts and other parasites of cereals in the Andean valleys of Patagonia.**] *Rev. Invest. agríc.* **1.** 267-77. 1947. [Inst. Fitotecnia, Min. Agric., Argentina] **190**

The small but fertile, well-watered and sheltered valleys of the Andean region of Patagonia are important for the growing of cereals in that otherwise bleak part of Argentina. The varieties commonly used are old Chilean varieties, which, although hardy and adapted to the region, are of poor quality and very susceptible to attack by parasites. Observations were made in 1944 and the principal fungous parasites of wheat, oats, barley and rye are listed. *Puccinia glumarum* is that causing most damage, especially to wheat, and next in importance come species of *Tilletia*. The *Berberis* species common in the region do not yet appear to have any significance in relation to the development of *Puccinia* strains. The wild grasses, especially some species of *Hordeum* very susceptible to *Puccinia glumarum*, clearly constitute an important means of propagation of the parasites listed.—G.M.R.

OKLAHOMA Agricultural Experiment Station. Tech. Bull. No. T-32. **Seasonal history of the southwestern corn borer,** *Diatraea grandiosella* **Dyar, in Oklahoma, and experiments on methods of control.** By *R. R. Walton,* and *G. A. Bieberdorf.* 1948. pp. 23. **191**

Diatraea grandiosella has caused serious damage to corn in the State. When the stubble, in which the borers overwinter, is destroyed they are subjected to the fluctuations of the weather. Listers, one-way disks and buzzard-wing sweeps were effective in uprooting the stubble ; ploughing under of the stubble to a depth of 4 to 6 in. prevented the emergence of moths. Most effective control was obtained when the stubble was uprooted before early February.—P.M.

DECKER, G. C. **Corn borer control through insecticides.** *Down to Earth* **4.** 2-3. 1948. [Illinois Agric. Exp. Sta.] **192**

Ryania or DDT sprays or dusts give successful control of the European corn borer. Time and the number of applications are of great importance if successful control is to be achieved. If a single application is made, dusts or sprays should be used 10 to 14 days after the first eggs hatch. When two treatments are made, applications should be 8 and 16 days after hatching. Three treatments should start 3 to 5 days after hatching and thereafter at 5 to 7 day intervals. When treatments are carried out four or more times, they should be started at the first hatching and continued at 5 to 7 day intervals.—P.M.

SCHLOSBERG, M., and BAKER, W. A. **Tests of sweet corn lines for resistance to European corn borer larvae.** *J. agric. Res.* **77.** 137-56. 1948. **193**

Of 977 sweet corn inbreds examined for inherent resistance to the larvae of *Pyrausta nubilalis* none showed immunity, but 44 did manifest some resistance, having from 42 to 2 per cent fewer borers than were predicted for them after tests lasting 3 or more years. Results from single crosses indicated incomplete dominance of either resistance or susceptibility. Type inbreds found resistant are listed for the Bantam, Country Gentleman and Evergreen lines. Further work is needed on the reaction to infestation by different strains of the borer.—K.J.S.

WELLMAN, F. L. Anotaciones sobre las enfermedades de las plantas en El Salvador. [**Notes on plant diseases in El Salvador.**] *Rev. Agric. Costa Rica.* **20.** 55-66. 1948. [Secc. Plant Pathology, Inter-Amer. Inst. Agric. Sci., Turrialba, Costa Rica] **194**

The article includes a note on *Ustilago zeae* on maize. Crop rotation affords the best means of control. It is possible that varieties resistant to the fungus may develop in El Salvador.—G.M.R.

CHIAROMONTE, A. Il problema della Sesamia nella Somalia Italiana. [**The problem of** *Sesamia* **in Italian Somaliland.**] *Riv. Agric. subtrop. e. trop.* **42.** 42-7. 1948. **195**

Damages caused by *Sesamia cretica* Led., parasitizing maize, sugar-cane, durra, millet and broom-corn, are reported from Italian Somaliland, Egypt and Anglo-Egyptian Sudan. Until a complete knowledge of the life of *Sesamia* is reached, the author suggests cultural methods of control chiefly the use of bait-plants of maize for the protection both of maize and sugar cane. These bait-plants should be sown before the maize crop and, when attacked by *Sesamia*, cut and used as fodder or silage. Selection of resistent varieties (American maize varieties are more resistant than Egyptian varieties) and early sowing and planting are also suggested.—E.B.

LANSADE, M. Sur le traitement du charbon de l'avoine, *Ustilago avenae* (pers.) Jens. [**Treatment of smut in oats.**] *C. R. Acad. Agric. France* **34.** 583-8. 1948. [Stat. Centr. Pathologie végétale, Versailles] **196**

Trials were made with formaldehyde and its derivatives, organic compounds of mercury, hot water, and various other known fungicides. A solution of formaldehyde in water of the strength of .033 litre formaldehyde to 100 litres water and shaken up for 15 or 20 minutes removes all trace of smut.—D.B.

HUANG, G. P. **A survey of the damage done by the rice-borer in Szechuan.** *Nung Pao* **6.** 187-191. 1941. **197**

The results of a survey of the damages done by the rice-borer in 66 counties during 3 years (1938-40) are tabulated. It is estimated that the loss due to this insect is about 14-22 million Tons (app. 1.4-2.2 million metric tons) or 9-15 per cent of the total production per year.—H.C.Y.

DRAGHETTI, A. Natura genetico-morfologica-ambientale della resistenza del frumento alle Puccinie sp. [**Genetical, morphological and environmental nature of resistance of wheat to** *Puccinia* **sp.**] *Genet. agrar.* **1.** 103-11. [English summary, p. 111.] 1946. **198**

(See *Plant Breed. Abstr.* 16, No. 4, Abst. 1715)

MALIANI, C. La carie del grano. [**Bunt of wheat.**] *G. Agric.* **58.** No. 33-34. 5. 1948. **199**

Instructions are given on the use of powder containing copper oxychloride for the disinfection of wheat seed to prevent bunt. The powder must be well mixed into the seed and a simple apparatus built for this purpose is described. To disinfect a few quintals of seed, 300 grm. per quintal are to be employed; for larger quantities of seed 100-200 grm. per quintal are sufficient.—E.B.

TODARO, F. Le carie del grano. [**Bunts of wheat.**] *G. Agric.* **58.** No. 35. 5. 1948. **200**

Tilletia tritici and *Tilletia laevis* are the two parasites which cause bunt of wheat. The infection is transmitted through the seed and the soil, and can be prevented by disinfection of the seed (powder containing copper oxychloride and lime has proved to be most effective) and by avoiding repeated wheat cultivation on the same soil.—E.B.

EL-HELALY, A. F. **The influence of cultural conditions on flag smut of wheat.** *Phytopathology* **38.** 688-97. 1948. **201**

Flag smut is prevalent, particularly on the Hindi and Mabrouk varieties, in the Delta, Lower Egypt, and decreases southward, becoming rare in

Upper Egypt. Plants of late sowing (up to Dec. 1st) are badly attacked. Temperature seems to be the important factor.

The "Herati" method of deep sowing in moist soil, which is then left unirrigated for a month, favours attack: "Herati" seed is usually soaked for 8-15 days before sowing. Attack is less with "Afir" sowing in which dry seed is sown in dry soil and irrigated immediately. The disease was not controlled by manuring or water supply during the growth period. Baladi and Kazouria wheats are immune. Partial control was obtained by seed disinfection with 0.5 per cent Germisan, Upsulun sulphur, copper carbonate and Agrosan G. "Afir" sowing, clean seed and soil and early sowing are recommended.—K.J.S.

VERVELDE, G. J. Over de beteekenis der kafnaald bij onze granen. **On the role of the awns in cereals.** *Med. LandbHoogesch. Wageningen* **48.** 35-60. [English summary, p. 59] 1946. [Lab. Crop Husbandry, Agric. Coll., Wageningen, Netherlands] **202**

The literature is discussed with special reference to the ways in which awns may contribute towards the desirability of a cereal. (1) The unfavourable effect of de-awning was demonstrated in experiments with wheat and barley: in rye the effect was dubious. (2) Measurements were made of the kernel weights of awned and awnless plants from F_2-progenies of crosses between an awnless and a number of awned varieties of wheat. Averaged over all crosses, kernels from awned plants were found to be exactly as heavy as those of awnless plants. (3) Using earlier data about the assimilation and transpiration capacity of the awns and more recent views on the translocation of assimilates in the plant, an attempt is made to estimate the effect of the presence of awns on the development of kernels. It is shown that the awns will always positively contribute to the filling of the kernels unless they increase transpiration to such an extent that the water supply is disturbed. (4) From this point of view one may reasonably expect that some factor has obscured the favourable influence of the awns in the experiment mentioned under (2). In fact the awned F_2-plants turned out to have formed more kernels per ear and more ears per plant than the awnless ones, so that the greater production of the bearded plants was distributed over a large number of kernels and no greater kernel weight resulted. On the average bearded culms outyielded beardless ones with 5.74 per cent and bearded plants produced 8.47 per cent more than beardless plants. (5) The influence of the presence of awns upon tillering capacity and length of ears is more or less unexpected. Suggestions are made for further investigations into this.—From author's summary.

FORLANI, R. Allogamia in alcuni cereali. [**Cross-fertilization in certain cereals.**] *Genet. agrar.* **1.** 130-46. [English summary, pp. 145-6] 1947. **203**

[See *Plant Breed. Abstr.* 17. No. 4. Abst. 1606]

KRUGER, Ursula. Die Wirkung einer Bestäubungsbeschränkung beim Roggen und ihre Erklärung. [**The effect of a limitation of pollination in rye and the explanation.**] *Züchter* **17/18.** 146-53. 1947. [Univ. Berlin] **204**

See *Plant Breed. Abstr.*

PIROVANO, A. Sugli effetti di una spiccata eterosi nel mais. [**On the effects of a conspicuous heterosis in maize.**] *Ann. Sper. agr.* **1.** 17-25. [English summary, p. 25] 1947. **205**

A dwarf mutation of maize, obtained by exposing ovaries to an alternating magnetic field current with 45 hz., which up to the sixth generation proved stabilized for the nanism character and accessory phenological characters, has been crossed with the giant variety Gold Dent. Offspring from F_1 are all of tall size, often bearing gigantic ears having up to 24 rows of kernels and showing extreme leaf deformations and abnormalities of ears as well as abnormal percentages of xenia. It has been observed that normally, in crosses between a type with yellow and another with violet-black kernels, 25 per cent of yellow and 75 per cent of violet kernels are counted, while an inverse proportion is observed in some cases. Ears have been self-fertilized. In the second generation cases of sterility are noted and a high percentage of seedlings with white leaves, dying off as soon as the reserves of the cotyledons are exhausted. Cytological examination did not reveal, in the dwarf mutation employed as a parent, any abnormality in chromosomes.

An analogous crossing of dwarf maize with the early variety "Attilio" has given excellent results from a practical point of view.—From author's summary.

CROIZAT, L. **The inflorescence of Zea mays. A restatement.** *Rev. argent. Agron.* **15.** 160-211. [Spanish summary, pp 210-1.] 1948. [Fac. Ing. Agron., Univ. Cent., and Min. Agric., Caracas, Venezuela] **206**

Work by P. C. Mangelsdorf on "The origin and nature of the ear of maize" (*Bot. Mus. Leafl. Harvard* 12. 33-75 1945, and *Plant Breeding Abstracts* 16. pp. 489-90. 1946) is reviewed. The author's own conclusions are at variance with those of Mangelsdorf, and the article is devoted mainly to a discussion of what is properly understood by "fusion," of phyllotaxy generally and of the phyllotaxy or the ear of *Zea mays*. He is of the opinion that the ear is primarily due to a process of "concrescence" which is elucidated in the text. The article is in English.—G.M.R.

Forlani, R. Sulle spighe ramificate o "del miracolo". [**Branched or "miracle" ears.**] *Genet. agrar.* **1.** 78-94. [English summary, p. 94] 1946. **207**

The author describes cases of branched ears in plants obtained by wheats having normal ears and follows the behaviour of the "branched ear" character when "miracle" wheat is crossed with normal wheat. Abnormal inflorescences, besides in wheat, have been observed in barley, *Lolium temulentum* and rye.—E.B.

Schrank, A. R. **Electrical and curvature responses of the *Avena* coleoptile to transversely applied direct current.** *Plant Physiology* **23.** 188-200. 1948. [Univ. Texas, Austin 12] **208**

The present investigation is an extension of former work (see *Herb. Abstr.* 14, Abs. 1694; 15, Abs. 1112; 16, Abs. 1281; 17, Abs. 445 and 811). The significance of the present experiments is largely dependent on the fact that induced curvature is a result of growth and not turgor. When the problem of hormone transport was investigated it was found that the magnitude of the transverse electrical polarity and the time course of the electrical changes were not dependent on the distribution of the growth hormones.—D.B.

КОЛОСОВ, И. И. Формирование корня как органа поглощения в процессе развития растений. *Доклады Акад. Наук СССР*, Том 58. *No.* 6, стр. 1197-200. 1947.

Kolosov, I. I. [**Formation of roots as organs of absorption in the process of plant development.**] *Doklady Akad. Nauk SSSR,* **58.** 1197-200. 1947. [Timirjazev Inst. Pl. Physiol., Acad. Sci. USSR] **209**

The growth and development of roots is closely connected with the development and activity of the plant's organs of assimilation. Leaves exposed to light form hormones which take part in the formation and growth of roots which are thus dependent on formation and development of the assimilatory organs. The present work comprises a study of this inter-dependence in barley, and a formula is evolved relating the dimensions of the root to its absorbing surface. There are also data relating these dimensions with leaf area and air-dry weight at different growth stages which include the beginning and ending of tillering, beginning of earing, beginning of milk-ripeness and at complete ripeness. Experiments with shading the leaves to vary light intensity show that lowered intensity reduces assimilation activity of the leaves and this induces a corresponding deterioration in root development.—M.H.

ПСАРЕВ, Г. М., и ВЕСЕЛОВСКАЯ, Х. А. О влиянии некоторых синтетических веществ на развитие зародышевых корней у озимой пшеницы. *Доклады Акад. Наук СССР*, Том 56. *No.* 9. стр. 973-6. 1947.

Psarev, G. M., and Veselovskaja, H. A. [**The effect of some synthetic substances on development of embryonic roots in winter wheat.**] *Doklady Akad. Nauk SSSR.* **56.** 973-6. 1947. [State Univ., Rostov-on-Don] **210**

The work of many authors has established the fact that seeds are rich in phytohormones of the groups bios and auxin which occur either as reserves or in the free active form. It has not generally been proved that the artificial introduction into seed of the hormones has little influence on germination. To elucidate the facts, the authors made a study with the following substances: heteroauxin, aneurin, nicotinic acid, water extract of yeast, and ascorbic acid. It is maintained that results should be of value to the south-eastern region of USSR where there are problems of rooting in the crops.

The experiments were also designed to determine a means to introduce a specific dose of the substances into the seeds. The usual soaking method does not permit controlling the amount of substances taken up. The vacuum-infiltration method was therefore used with solutions and seed was weighed before and after infiltration. There is evidence that (1) aneurin has the most beneficial effect on rooting (especially lateral roots) in winter wheat Hostianum 237; (2) heteroauxin in high concentrations retards growth of the primary and lateral roots; and (3) the physiological significance of the synthetic substances on root formation is varied.—M.H.

Rogers, L. H., and Wu, Chih-Hwa. **Zinc uptake by oats as influenced by application of lime and phosphate.** *J. Amer. Soc. Agron.* **40.** 563-6. 1948. **211**

Replicated pot experiments on oats grown on virgin fine sand showed that zinc content decreased to an almost constant value with increase in rates of P applications, while P content increased regularly in direct ratio to that applied. Higher rates of P (1000 and 1500 lb. per acre) resulted in significantly increased yields at the second cutting. Zinc content decreased with increasing rates of liming, but increased regularly with increasing zinc applications.—K.J.S.

ОКУНЦОВ, М. М. Влияние меди на образование хлорофилла. *Доклады Акад. Наук СССР*, Том 57. *No.* 4. стр. 407-8. 1947.

Okuncov, M. M. [**Effect of copper on formation of chlorophyll.**] *Doklady Akad. Nauk SSSR* **57.** 407-8. 1947. [Tomsk State Univ.] **212**

It has been shown by various works that

copper increases the intensity of green colour in leaves and their chlorophyll content. There is, however, little information on the mechanism by which this effect is produced. The author's tests with oats have shown that copper does not influence chlorophyll formation, nor the rate by which etiolated seedlings become green. The function of copper on chlorophyll is a stabilizing one as a result of which there is slower chlorophyll destruction.—M.H.

ВОСКРЕСЕНСКАЯ, Н. П. О значении катиона калия для фотосинтеза. *Доклады Акад. Наук СССР*, Том 59. *No.* 2. стр. 359-62. 1948.

VOSKRESENSKAJA, N. P. [**The importance of potassium cations in photosynthesis.**] *Doklady Akad. Nauk SSSR.* **59.** 359-62. 1948. [Timirjazev Inst. Pl. Physiol., Acad. Sci. USSR] **213**

The work was designed to study the transitory influence of K, Ca and Na on intensity of photosynthesis. The plant used was the Viner variety of barley, 20 days old, grown in culture with Hellriegel's nutrient solution. If the nutrient medium contains 0.1 *M* NaCl, the photosynthetic intensity is not affected, but $CaCl_2$ in the same concentration lowers it, and KCl greatly increases it. The author has not only confirmed the positive effect of K, but has studied the constancy of its action in relation to K nutrition during growth of the plant and also the effect of K on shaded specimens. The positive effect of K is observed when there is increasing monose content of the leaves, and it is concluded that the action of K is indirect.—M.H.

MILTHORPE, J., and ROBERTSON, R. N. **Studies in the metabolism of plant cells. 6. Salt respiration and accumulation in barley roots.** *Aust. J. exp. Biol.* **26.** 189-97. 1948. **214**

Respiration measurements on excised barley roots in water and in dilute solutions of potassium chloride, glucose and potassium cyanide show that barley roots are generally similar to storage tissues of beet and carrot in their power to accumulate ions. The respiration of all three is increased on transfer from water to salt solution; there is rapid uptake of KCl within the first 15 minutes. Salt respiration and accumulation are inhibited by 0.001 *M* KCN; the previously accumulated salt may be lost more readily from barley roots than from storage tissues.—K.J.S.

BONNER, J. **Biochemical mechanisms in the respiration of the *Avena* coleoptile.** *Arch. Biochem.* **17.** 311-26. 1948. **215**

The terminal oxidase of *Avena* coleoptile respiration appears to be cytochrome oxidase. This conclusion is based primarily on the facts that an enzyme capable of oxidizing cytochrome is found in the coleoptile and that respiration is inhibited by both cyanide and azide, inhibitors of this enzyme.

The *Avena* coleoptile contains enzymes for the phosphorylation of hexose to fructose diphosphate. This phosphorylation is increased in the presence of added ATP. Pyruvate can be oxidized by the coleoptile, and it is suggested that pyruvate may be the terminal product of the initial breakdown of hexose by the *Avena* coleoptile.

The oxidation of pyruvate by the *Avena* coleoptile is inhabitable by malonate, and this inhibition may be partially reversed by the further addition of fumarate, isocitrate or ketoglutarate. In the presence of malonate, both fumarate and ketoglutarate are converted to, and accumulate as, succinate. These facts are in accord with the hypothesis that respiration in the *Avena* coleoptile proceeds through a system generally similar to the Krebs cycle.—Author's summary.

BALDACCI, E., and CIFERRI, R. Prime prove di resistenza al freddo di frumenti italiani. [**Preliminary experiments of resistance to cold of Italian wheats.**] *Ann. Sper. agr.* **1.** 5-16. [English summary, pp. 14-5.] 1947. **216**

BECKER, J., FUCHS, W. H., and JAPHA, B. Grundlagen und Erfahrungen der Züchting winterfester Weizen. [**The principles and practice of breeding winter-hardy wheat.**] *Züchter* **17/18.** 235-40. [Univ. Halle] **217**

Nature and course of the damage due to snow and frost, the inherited capacity of the plant to react, the inter-relationship of the individual factors, and the procedure for testing are discussed.—D.B.

STRAIB, W. Beiträge zur Kenntnis der Frosthärte des Weizens. [**Frost resistance in wheat.**] *Züchter* **17/18.** 1-12. 1946. [State Biol. Inst., Sub-Station Gliesmarode] **218**

A report is given of the performance of some hundreds of Gliesmarode varieties of wheat during the severe winter of 1941/42. Laboratory experiments on the survivors showed that in the middle of North Germany low temperature was the principal cause of winterkilling, that there appears to be no correlation between frost resistance and tendency to sprout, and that the frost-resistant varieties were susceptible to *Puccinia glumarum*.—D.B.

EKSTRAND, H. Eräitä kasvipatologisia näkökontia syysviljojen ja nurmiheinien talvehtimisesta. [**Views on plant pathology of the overwintering of autumn cereals and meadow grasses.**] *Maatalout. Aikakaust.* **19.** 39-59. [Swedish summary, pp. 57-9.] 1947. **219**

The necessity for closer collaboration between the agricultural experiment service and the plant pathology service is emphasized. Some of the results obtained during studies on overwintering of autumn cereals and meadow grasses are reviewed.

In wheat, Åkerman *et al.* found that different varieties show different resistance to cold. In rye according to laboratory tests different varieties also have different cold resistance, but in the author's investigations it has not been possible up to the present to observe this in the field. In some rye trials in Scania in 1939-40, one of the extremely cold winters, when wheat was very severely injured by cold, it was seen that "the cold injuries" were correlated with the condition of the seed, so that it was not a question of any actual cold injuries, but only that the plants weakened through *Fusarium* attack had been less cold resistant. The more severe the *Fusarium* infection in the seed, the greater was the dying out from cold during the winter, irrespective of whether the varieties belonged to the varieties resistant to cold according to Åkerman and Andersson and those resistant to *Fusarium* according to the writer's investigations or to the varieties more susceptible to these. With disinfected seed dying out was less than with untreated seed, but even then dying out was correlated with the degree of infection of the untreated seed. No actual cold injuries have been observed in rye during all the years the investigations have been in progress.

Many of the rye trials have shown that different varieties exhibit very different resistance to attack and killing out by snow mould caused by *Fusarium nivale.* The more resistant varieties with severe snow mould attack show less dying out than the more susceptible ones even though the seed has been heavily infected with *Fusarium.* Even after disinfection of the seed, dying out may be very considerable in the non-resistant varieties. The rye varieties may be divided into two groups, a resistant group, to which belong *inter alia* the Finnish varieties Oiva, Toivo, Sangaste, Björn, some land varieties, in particular North Bothnia rye varieties, and midsummer rye varieties: and a susceptible group, in which are included Improved Vasa II, Stål, Kungs, Malm and Petkus rye. As to the other winter killing fungi, differences have been shown in resistance to *Typhula borealis* and *Sclerotinia borealis* both in autumn cereals and meadow grasses. In rye the main groups include the same varieties as the two resistance groups concerning snow mould, although varietal distribution within these is different as regards the degree of attack of the different fungi. Wheat is much more heavily attacked by these fungi than rye, but here too different varieties show different resistance. Breeding and growing of the seed must be carried out within the cultivation areas for which the varieties and strains are intended, otherwise resistance to the different diseases may be reduced.

Manurial trials have shown clearly that attack by winter killing fungi is more severe with nutrient deficiency. Finnish and Swedish experiments indicate that phosphatic manuring increases the winter-hardiness of rye.—R.P.J.

BOTTAZZI, G. B. Esperienze di jarovizzazione del frumento. [**Trials of wheat vernalization.**] *Genet. agrar.* **1.** 147-66. [English summary p. 166] 1947. **220**

[See *Plant Breed. Abstr.* 17. No. 4. Abst. 1618]

SAYRE, J. D. **Mineral accumulation in corn.** *Plant Physiology* **23.** 267-81. 1948. [Ohio Agric. Exp. Sta., Wooster] **221**

Nitrogen, phosphorus and potassium, the elements studied, entered the plant and moved from one tissue to another independently of each other. The accumulation of these elements reached their maxima in the plant as a whole at different stages of maturity; nitrogen at silking, phosphorus at maturity, and potassium 3 weeks after silking. Nitrogen and phosphorus moved from other tissues into the grain; potassium did not accumulate in the grain.—D.B.

ЗУЕВ, Л. А. Динамика форм фосфорных соединений в растении. *Доклады Акад. Наук СССР*. Том 58. *No*. 6. стр. 1091-4. 1947.

ZUEV, L. A. [**Dynamics of the forms of phosphoric compounds in the plant.**] *Doklady Akad. Nauk SSSR.* **58.** 1091-4. 1947. [M. V. Lomonosov State University, Moscow] **222**

The importance of phosphorus in plant nutrition in the early growth stage has long been recognized. In the present work study is made of the dynamics of the separate fractions of P compounds in oat leaves during development of the plant with different levels of phosphate nutrition. The plants were sampled at the following stages and dates: (1) at tillering, 6 July; (2) emergence of panicles, 25 July; (3) at flowering, 31 August; and (4) at ripening, 4 October. There is decline in P_2O_5 content with increase in leaf age, and as the general mass of dry substance in the leaf also decreases with age, the absolute decrease is much greater. The following conclusions are made: at the beginning of the growth period P_2O_5 in the leaves occurs chiefly in the form of organic compounds, the greater part comprising soluble organic compounds of phosphorus; the nucleo-proteids at the beginning of the growth period are composed in greater part of protein the greater the phosphoric acid supply in the plant; with increasing age of the plant there is a decrease in content of all fractions of P_2O_5 organic compounds; the P_2O_5 of nucleo-proteids falls sharply from tillering to panicle emergence and is more rapid with fluctuation in protein nitrogen.—M.H.

Capen, R. G., and Leclerc, J. A. **Wild rice and its chemical composition.** *J. agric. Res.* **77.** 65-79. 1948. [Bur. Agric. Ind. Chem., U.S. Dept. Agric.] **223**

Thirty-six samples of wild rice (*Zizania aquatica*) were collected mainly from the lake region of northern Minnesota in an air-dried state and after curing or parching (heating in a vessel till the hulls are partly charred). The methods of harvesting and curing practised by the Indians are briefly described. Full analytical data recorded show that the protein content of wild rice grain (about 14 per cent) compares very favourably with that of the cereals and of buckwheat and sorghum. The loss of thiamin due to parching corresponds to that expected as a result of heating and of bran and husk removal.—K.J.S.

КАЗАКОВ, Е. Д. Количественное соотношение и зольность составных частей зерна ржи. *Доклады Акад. Наук СССР*, Том 58, *No.* 6. стр. 1081-2. 1947.

Kazakov, E. D. [**Quantitative relation and ash content of component parts of rye grain.**] *Doklady Akad. Nauk SSSR.* **58.** 1081-2. 1947. **224**

The material for the analyses comprised the following rye varieties: (1) Vjatka, from the Kukmorsk local type of Tatar ASSR; (2) Avangrad, from the Čarymsk local type of the Altaĭ region; (3) Lisicin, from the Ternovsk local type of the Penzensk province; (4) Voronež SHI, from the Arzamassk local form of the Gorjkii province; and (5) Kazan 5 + 6, from the Arzamassk local form of the Gorjkii province. The rye grain was harvested in 1944 and the following data obtained:—

Weight relations of the component parts expressed in percentages of absolute dry substances:

Plant part	(1)	(2)	(3)	(4)	(5)	Average
Pericarp and seed coat	7.10	7.20	7.48	7.92	7.40	7.42
Aleurone layer	10.28	10.96	11.64	10.13	12.91	11.18
Total coverings	17.38	18.16	19.12	18.05	20.31	18.60
Endosperm	79.19	78.26	77.06	77.94	75.96	77.69
Embryo	3.43	3.58	3.82	4.01	3.73	3.71

Ash content of component parts in percentages of absolute dry substance:

Plant part	(1)	(2)	(3)	(4)	(5)	Average
Pericarp and seed coat	3.39	3.44	3.29	3.34	3.18	3.33
Aleurone layer	7.72	7.55	7.37	8.91	8.31	7.97
Total coverings	5.95	5.92	5.77	6.47	6.44	6.11
Endosperm	0.41	0.39	0.36	0.48	0.46	0.42
Embryo	5.84	5.58	4.56	4.48	6.03	5.30

—M.H.

Ventre, E. K., Byall, S., and Catlett, J. L. **Sucrose, dextrose, and levulose content of some domestic varieties of sorgo at different stages of maturity.** *J. agric. Res.* **76.** 145-51. 1948. [Bur. Agric. Ind. Chem., U.S. Dept. Agric.] **225**

Following a suggestion that sorgo cane might be processed in separate parts for the extraction of sucrose and dextrose, 34 species of *Sorghum vulgare* were grown experimentally at the field station near Mendian, Mississippi and analysed for total sugars, dextrose and levulose at 3 different growth stages. Summary data from 18 varieties show the following values:—

Stage of maturity	*Total sugars*		*Dextrose*	*Levulose*
	In expressed juice %	In % of Brix. solids		
Milkstage ..	13.38	83.46	3.27	2.28
Dough-to-ripe stage ..	13.95	83.28	1.91	1.17
Dead-ripe stage	15.07	83.25	1.65	.63

The excess of dextrose over levulose is not sufficient to warrant commercial processing of the sorgo for crystalline dextrose. Full analytical data are recorded in the original paper.—K.J.S.

Singer, T. P., and Hofstee, B. H. J. **Studies on wheat germ lipase. 1. Methods of estimation, purification, and general properties of the enzyme.** *Arch. Biochem.* **18.** 229-43. 1948. **226**

A lipase from wheat germ was obtained in soluble form and partly purified. The enzyme acted on a large series of water-soluble simple esters, mono- and tri-glycerides, and on the laurate and palmitate esters of sorbitan derivatives. Evidence was obtained to show that in all probability a single enzyme is responsible for the activation of these different substrates. The enzyme is a water soluble protein, inhibited by all reagents commonly used for testing—SH enzymes. Ca ++ did not affect the activity.

Two assay methods were adopted to the measurement of the kinetics of wheat germ lipase; one involved the monometric measurement of the hydrolysis of esters in a bicarbonate buffer and the other the steam distillation of the fatty acids liberated.—From authors' summary.

Singer, T. P., and Hofstee, B. J. H. **Studies on wheat germ lipase. II. kinetics.** *Arch. Biochem.* **18.** 245-59. 1948. **227**

A study was made of the kinetics of wheat germ lipase. In the presence of excess substrate consisting of either glycerides or simple esters, the enzyme followed a zero order reaction. At 38°C. the pH of optimum stability of the enzyme was approximately 6.8, and the apparent pH optimum was at 7.4 under the experimental conditions. The inactivation of the enzyme by heat followed a second order reaction, and the energies of inactivation were found to be 65,100 cal./mole at pH 6.8 and 56,000 cal./mole at pH 7.5. The energies of activation of the enzymatic hydrolysis of triacetin and monobutyrin were found to be 7850 cal./mole for monobytyrin and 5710 cal./mole for triacetin. Under the experimental condition the apparent temperature optimum was 38°C. for a series of substrates.

The dissociation constants of 8 of the common substrates were studied and a marked correlation was observed between molecular size and the dissociation constant.—From authors' summary.

Giacanelli, E. Ricerche sul contenuto in catalasi di varie razze di frumenti. [**Studies on the catalase content of various wheat races.**] *Genet. agrar.* **1.** 225-36. [English summary, p. 236] 1947. **228**

Catalase content of 5 of the wheat varieties bred by Strampelli was estimated with Burge's gas-volumetric method. Every wheat variety has a constant value of catalase content for the same locality. This value varies according to the locality in which the grain is grown, but the relative order of the varieties remains the same. Experimental baking tests showed that varieties with the highest catalase content also had the best baking qualities. This reaction of wheat catalase with hydrogen peroxide may also be useful to reveal the age (and, approximately, the percentage of germination) of the seed for a given variety as the catalase content decreases with ageing.—E.B.

ХОЛОДНЫЙ, Н. Г. Биологическое значение фитогенных органических веществ атмосферы. *Бюлл. Москов. Общества Испыт. Природы*, Том 53, Вып. 1, стр. 53-71. 1948.

Holodnyĭ, N. G. [**Biological significance of phytogenic organic substances of the atmosphere.**] *Bjull. Moskov. Obščestva Ispyt. Prirody*, **53.** 53-71. 1948. **229**

The work is concerned with the role in nature of volatile organic substances which are excreted in the atmosphere by plants. See also *Herb. Abstr.* 15. Abs. 361. Experiments have been made with isolated roots of maize seedlings and other plants for which the sole source of organic substances comprised the volatile constituents in the air from germinating seed of peas and maize. In the presence of these substances, the maize roots grew better and remained alive much longer than when grown without them. Roots of sunflower showed the same reaction, but to a lesser degree. Roots of peas showed this reaction only in the presence of substances formed in the air by maize grain.

The author established a connexion between the above reaction of the maize root to volatile excretion of seeds and the presence of microflora on the root surface, which develop because of the excretions. The work includes data showing that the bacteria of the rhizosphere absorb organic compounds from the air (which compounds in themselves have a retarding effect on root growth) and in exchange excrete from their cells other substances which stimulate growth of this organ and facilitate extension of its life when isolated. These latter substances, in the author's opinion, belong to the group of physiological activators (phytohormones, vitamins, pro-vitamins). For vitamins excreted by plants and contained in the air, the author suggests the name atmovitamins and he maintains that they have a beneficial effect on animal and human life when inhaled.—M.H.

Dionigi, A. Eredità del carattere " letargo delle cariossidi " in incroci reciproci di frumento. Meccanismo di letargo dei semi. [**Inheritance of the character " delayed germination of the caryopsis " in reciprocal crosses of wheat. Mechanism of delayed germination of the seed.**] *Genet. agrar.* **1.** 32-7. [English summary, p. 37.] 1946. **230**

[See *Plant Breed. Abstr.* 16, No. 4, Abst. 1707]

Ruge, U. Versuche zur Beeinflussung der Nachreife der Sommergerste. [**Experiments to modify the after-ripening of summer barley.**] *Züchter* **17/18.** 59-62. 1946. [Univ. Kiel] **231**

Progressive after-ripening in summer barley increases the speed of germination to a greater extent than capacity for germination. After-ripening is hastened by storage of the soaked grain at low temperature (5°C.) for 5 to 8 days and is still more rapid if, instead of tap water, the seeds are soaked in solutions of manganese sulphate, magnesium sulphate or potassium permanganate. A combined treatment with salts of manganese and low temperature can induce freshly-harvested barley to germinate within a few days. Reducing agents delay and oxidizing agents hasten after-ripening. The results of these experiments, conducted on " Morgenrot " variety, show that by the double treatment indicated, after-ripening can be so hastened as to make a second seeding in the same harvest year both possible and worth while. This second seeding can produce green fodder in autumn.—D.B.

Romano, E. Sul potere riducente durante la formazione e la germinazione della cariosside di frumento. [**On the reducing power of wheat grain during its formation and germination.**] *Ann. Sper. agrar.* **2.** 63-8. [English summary, p. 68.] 1948. **232**

Reducing power of wheat grain on nitrates has been studied during ripening stages and germination : in ripening stages it has about the same value as in ripe seed, while during germination it is about 100 times higher. This confirms that in seed the synthesis takes place in an oxidising ambient and demolition in a reducing one.—(From author's summary.)

JONG, Antoinette M. de. De invloed van het vochtgehalte van kiemende gerst op de ontwikkeling van zetmeelsplitsende enzymen. [**The influence of the water content of germinating barley on the development of soluble amylase.**] *Med. nat. Com. Brouwgerst* No. 9. 63-70. [English summary, p. 70.] 1944. [Received 1948] **233**

The influence of the water content of germinating barley grains on the amount of soluble amylase was investigated. The grains were steeped for 48 hours and then allowed to germinate for 6 days under varying conditions of moisture, at a temperature of 11-15°C. In this way differences in water content ranging from 32 to 80 per cent could be obtained. With increasing water content an ever increasing amount of amylase was found, but when the water content surpassed about 65 per cent the results become rather uncertain, because of technical difficulties in the determination of the water content.

Moreover the germination became abnormal. —Author's summary.

VELDHUIZEN, H. van, and GOMBERT, J. De ontwikkeling van het amylase-gehalte tijdens de kieming in kiemende en niet-kiemende korrels. [**The development of the amylase content in germinating and non-germinating grains.**] *Med. nat. Com. Brouwgerst* No. 4. 71-2. [English summary, p. 72.] 1944. [Received 1948] **234**

Contrary to prevailing opinions, it was found that barley grains which have lost their germination power are still able to produce amylase. After steeping and keeping the non-germinating grains under germination conditions, the diastatic power had increased from 40 to 120 units.—Authors' summary.

БАХТЕЕВ, Ф. Х. Новая классификация возделываемых ячменей. *Доклады Акад. Наук СССР.* Том 59. *No.* 5. стр. 973-6. 1948.

BAH̆TEEV, F. H. [**A new classification of cultivated barleys.**] *Doklady Akad. Nauk SSSR.* **59.** 973-6. 1948. [Central Bot. Garden, Acad. Sci., USSR] **235**

The existing systematics of cultivated barleys, based on a few characteristics of the ears, are quite inadequate for even external features of the different barley plants, apart from their biological, agronomic and other distinctive attributes. This revision of barley classification was carried out by the author in the All-Union Institute of Plant Industry. Instead of applying the normal division into species, based on the degree of fertility of the three spikelets, the criteria involved are not only morphological distinctions, but also the origin (evolutionary, geographic, ecological and historical) of this ancient plant. From a detailed study of sowings of a world-wide collection of barleys in widely dispersed territories of the Soviet Union, it is concluded that the cultivated species should be classified as follows :

I. *Hordeum euroasiaticum* Vav. et Bacht.
  α. ssp. *H. antasiaticum* Bacht.
  β. ssp. *H. mediterraneum* Bacht.
  γ. ssp. *H. medioasiaticum* Bacht.
II. *H. sinojaponicum* Vav. et Bacht.
III. *H. aethiopicum* Vav. et Bacht.

Details are given of the plant characters and their distribution, and the species are further subdivided into proles and sub-proles (agro-ecological groups) in which distinguishing criteria are : life form, vegetative period, reaction to temperature and daylength, plant habit, characteristics of stems, leaves, ears and grain, and resistance to diseases and pests.

Details of the classification are in manuscript form only (dated 1946), with the title " Ecological-geographical bases of phylogeny and selection of barleys."—M.H.

MANGELSDORF, P. C., and REEVES, R. G. **The origin of maize : present status of the problem.** *Amer. Anthrop.* **47.** 235-43. 1945. **236**

Whiting's controversial views are criticized and evidence is quoted in support of the authors' theory that teosinte is a hybrid of maize and *Tripsacum*, and that maize originated in Western South America.—K.J.S.

LEGUMES AND GRAIN LEGUMES

DECKERS, J. H. F. De teelt van erwten op zandgrond. [**The growing of peas in sandy lands.**] *Maandbl. LandbVoorlDnst* **5.** 426-8. 1948. [Agric. Adviser, St. Oedenrode, Netherlands] **237**

Peas are a relatively new culture in the Netherlands, although especially for the sandy regions they are eminently suitable and desirable both for improving soil fertility and for providing proteins for human and animal consumption. A short account is given of recent varietal and cultural trials, and the advantages of growing peas, together with the necessary conditions, are summarized.—G.M.R.

LAGOS U., J. A. Cultivo de la soya. [**Cultivation of the soybean.**] *Rev. Agric. Costa Rica* **20.** 365-7. 1948. **238**

Directions for cultivation.—G.M.R.

LAMBERTS, H. De teelt, de veredeling en de zaaizaadvoorziening van de voederlupine. [**The cultivation, breeding and seed supply of the fodder lupin.**] *Landbouwk. Tijdschr.* **60.** 413-21. 1948. [Plant Breeding Inst., Wageningen, Netherlands] **239**

The author prefers the term " fodder lupin " for the alkaloid-free lupin, as the original German product has been patented under the name " sweet lupin". He gives an historical account of its breeding and discusses the following characters, which are or should be subjects of breeding work: tendency of the pods to shatter; hardness of seed; slow early development; early ripening; resistance to disease, especially virus disease; sensitivity to lime; glabrous pods (desirable); and white seed. After further discussion of the lupin for human consumption and of the possibility of breeding a lupin totally free of alkaloids, the present seed position in the Netherlands is described. Since the introduction of sweet lupins in 1935, seed supplies have become increasingly adulterated by bitter lupins, so that an enquiry in 1946 revealed a percentage presence of bitter lupins ranging from 1 to 95 and estimated to average 35. The Netherlands General Seed Inspection Service rules that the bitter seed content in seed used for growing fodder may not exceed 10 per cent, but in seed used for reproduction it may not exceed 6 per cent.—G.M.R.

DILLEWIJN, C. van Verslag van de in het jaar 1940 door de Rijkslandbouwconsulenten genomen veldproeven met peulvruchten. [**Report on the field trials of grain legumes conducted by the Netherlands Agricultural Advisers in 1940.**] *LandbVoorlDnst Med.* No. 24. 1942. pp. 76. [Cent. Inst. Agric., Res., Wageningen, Netherlands] **240**

A report on the yield of different varieties of peas and field beans in the various regions of the Netherlands. In judging the quality of peas, thousand-grain weight is found to be a better criterion than hectolitre weight.—G.M.R.

DILLEWIJN, C. van Verslag van de in het jaar 1941 door de Rijkslandbouwconsulenten genomen veldproeven met peulvruchten. [**Report on the field trials of grain legumes conducted by the Netherlands Agricultural Adviser in 1941.**] *LandbVoorlDnst Med.* No. 32. 1943. pp. 106. [Cent. Inst. Agric. Res., Wageningen, Netherlands] **241**

The results of 195 trials, 138 of which were of peas, are summarized. The number of trials was more than double that of the previous year, and more detailed studies of quality took place. Subjects investigated included planting distance, seeding rate, manurial treatment, the relation of soil acidity to yield (reduced yield of peas under a pH value less than 6.8), as well as comparison of varietal characters.—G.M.R.

BURLISON, W. L., DOREN, C. A. van, and HACKLEMAN, J. C. Once años de investigaciones con la soja (*Glycine soja* (L.) Sieb. y Succ.). Variedades, siembra y almacenamiento. [**Eleven years of soybean investigations. Varieties, seeding, storage.**] *Granos* . **10.** Nos. 10, 11 and 12. 44-6. 1946. **242**

A Spanish version by *R. Ramella* of Illinois Agric. Exp. Sta. Bull. 462, 1940. See *Herb. Abstr.* 10. Abs. 686.—G.M.R.

COHN, H. I. **The Rickard Koreans.** *Soybean Digest* **8.** 13 and 28. 1948. **243**

The Rickard Korean soybean, named after the man who introduced it to the United States, is not a new variety. The bean has been grown in Asia for very many years and was included in a sample of seed received at the Dominion Experiment Station, Ontario. An unusually large soybean, it was obtained from the Station by an Ontario farmer and later introduced into the United States.

The oil content of the Rickard Korean has been recorded as high as 21 per cent. In Canada, in 1944, the oil content was 19 per cent: the same bean planted in Illinois showed a moisture-free oil content of 20.7 per cent. Plants attain 24-36 in. under normal conditions, spacing between the nodes being very short—1.75 to 2 in. Beans are very large, the pods do not shatter easily and yields are excellent. The Regional Soybean Laboratory analyzed the 1946 crop and found an oil content of 20.8 per cent, protein 43.9 per cent and iodine number 130.2. The beans mature 8 to 15 days before Lincolns and 7 days earlier than Richlands.

The variety being well established in Illinois, attempts will be made to add it to the varieties now grown in south-east Missouri, where its high oil content and early maturity will meet many requirements.—P.M.

MCDOWELL, B. **S-100—new cotton belt bean.** *Soybean Digest* **8.** 20. 1948. **244**

This new medium-late soybean was developed by the University of Missouri. Maturing in 135 days, it is thus later than Lincoln, Brone and Chief and about 10 days earlier than Arksoy, Ralsoy and Ogden. Experiments have shown that S-100 will be well adapted from the northern rim of the cotton belt southwards. The new bean has good lodging resistance and gives high yields. In tests with 23 strains (mostly late maturing) it outyielded the average of all by 47 per cent.—P.M.

FUJIMOTO, C. K., and SHERMAN, G. D. **Manganese availability as influenced by steam sterilisation of soils.** *J. Amer. Soc. Agron.* **40.** 527-34. 1948. **245**

Steam sterilisation increased the exchangeable manganese phenomenally in a high-manganese soil of pH 5.5, and considerably in all soils tested. Plants grown in soils of varying Mn content took up more Mn from steam sterilised soils ; cowpeas on sterilised high-manganese soil had symptoms of excess Mn uptake such as are caused by soil dressings of 1000 lb. per acre of Mn SO_4. On low-manganese soils sterilisation improved growth.—K.J.S.

STECKEL, J. E. **Manganese-deficient soybeans in Indiana.** *Soybean Digest* **8.** 14-5. 1948. **246**

In Northern Indiana symptoms of manganese deficiency have been observed in soybeans. In 1946, investigations were made to measure the response of soybeans to manganese. Results of tests indicate that yellow-leafed beans respond to soil or spray treatments of manganese sulphate. Both treatments increase yields.—P.M.

FRANK, F. A. **Soybean production studies in Indiana.** *Soybean Digest* **8.** 18-20. 1948. [Dept. of Agron. Purdue Univ. Lafayette, Ind.] **247**

A 4-year study on the effect of fertility level and soil type on the growth, productivity and chemical composition of several soybean varieties, has been completed. Fertilization increased the yields and the oil content increased about 0.5 per cent on each of the 4 soil types included in the experiments. Direct fertilization resulted in remarkable yield increase under certain conditions. This especially was true on soils deficient in potash.

In experiments to determine the influence of soil temperature on the yield of soybeans, temperatures were measured in mulched and unmulched soils. Temperatures were higher in the unmulched soils, but yields were 40 per cent higher on mulched ground.

The effects of rock phosphate and superphosphate on soybeans were compared. " Although soil conditions favoured the use of rock phosphate, superphosphates on the average . . . , outyielded rock phosphate by 2 bu. per acre with negligible differences in the chemical composition of the beans."

Further experiments in crop rotations show that claims of adverse effects of soybeans on following clover crops, cannot be generalized.—P.M.

ROGERS, H. T. **Response and tolerance of various legumes to borax and critical levels of boron in soils and plants.** *Better Crops with Plant Food* **32.** 9-16 and 40-5. 1948. **248**

Field tests (between 1942 and 1946) with borax were carried out with alfalfa, bur clover, crimson clover, red clover, white clover, Austrian winter peas, blue lupin, vetch, soybeans, alyce clover, peanuts and sericea. The results of field tests showing the boron needs of these legumes are reported and there is a comparison between field response and soil and plant analyses in an attempt to evaluate methods for selecting boron deficient areas. Methods of placement of borax to avoid injury to plants, and the tolerance of several legumes to borax are discussed.—P.M.

BARRE, H. J. **Drying and storing soybeans on the farm.** *Soybean Digest* **8.** 14-5. 1948. **249**

Soybeans mature in the autumn and are thus often harvested with a high moisture content. If the beans are not sufficiently dry, the moisture content must be reduced to a level at which they can be stored safely, and afterwards, this level must be maintained in all parts of the storage bins.

Drying by natural ventilation in the bins has been practised extensively by farmers. The method is very slow, and in the case of wheat, only 1 to 1.5 per cent moisture is removed. Such a method cannot be relied upon for use with soybeans. During winter or cool weather, forced ventilation with natural air, whereby air is forced through the grain with a fan or blower, is very helpful in drying the grain and keeping it cool. Unless the air is heated, however, moisture content can seldom be reduced below 14 per cent during the months of April to November. If the beans begin to heat in the bin, some good may be done by moving the beans. A recent development is the use of forced heated air for drying the beans in the bin. No actual field experiments have been made with this process on soybeans but laboratory experiments have indicated that similar results to those obtained with shelled corn may be expected. With corn, a fan and heater is used to force the air through 6 to 8 feet of stored grain. The bin has a ventilated or false floor, about 12 to 18 in. above the regular floor, to give uniform air flow through the grain in all parts of the bin.—P.M.

YARWOOD, C. E. **Therapeutic treatments for rusts.** *Phytopathology* **38.** 542-51. 1948. **250**

Species inoculated with uredospores of their respective rusts were subsequently treated by methods previously reported useless by other workers on rust therapy. Bean rusts were eradicated by penetrating applications of dilute lime sulphur given up to 8 days after infection, spray effectiveness increasing with increasing concentration and with addition of spreader. Cyanide gas at concentrations of 70-2000 p.p.m. eradicated bean and snapdragon rusts in exposures of 15 min. and 12 hr. Vapours of lime-sulphur solutions also eradicated bean rust. Immersion of mint stocks and leaves of bean and snapdragon in hot water at

35-55°C. for stated periods eradicated the respective rusts. Except in cyanide treatments there was no host injury.—K.J.S.

Rosella, E. La bruche de la lentille. [**The pea-weevil.**] *C. R. Acad. Agric. France* **34.** 607-9. 1948. **251**

Kulash, W. M. **New insecticides for the control of soybean caterpillars.** *Soybean Digest* **8.** 16-7. 1948. [Assoc. Res. Prof. Dept. of Zool. and Ent. North Carolina, Sta. Coll. Raleigh] **252**

Soybean caterpillars have caused serious damage to crops in eastern North Carolina. The insects concerned are the velvet bean caterpillar (*Anticarsia gemmatalis*), the corn earworm (*Heliothis armigera*), the yellow striped army worm (*Prodenia ornithagalli*), and the fall army worm (*Laphygma frugiperda*).

Several insecticidal dusts were used to control these pests: 5 per cent DDT straight-grind, 5 per cent DDT micronized, benzene hexachloride of 1, 2, 5 and 10 per cent gamma isomer and 50 per cent *Ryanex*. One application of dust was made and a marked increase in yield was noted on each case. Two different plots in the same field were treated with 5 per cent DDT. The plot treated on Sept. 9 yielded nearly 34 per cent more than the one treated on Sept. 12, thus illustrating the effectiveness of early treatment.—P.M.

Allard, H. A. **The ecology of the wild kidney bean** *Phaseolus polystachios* **(L.) BSP.** *J. Wash. Acad. Sci.* **37.** 306-7. 1947. **253**

A delicate twining plant of thickets and woodlands on the coastal plain and Piedmont area of Virginia favoured by well-drained soil and good illumination. In loose, rich forest litter it becomes perennial and develops a large root stock which may penetrate the soil to 18 in. depth. Tuber formation is pronounced and appears to be a response to short day-length (10 hr.). The wild bean is a long-day type and requires 12·5 hr. daylight for twining, which is a pre-requisite of flowering. The chromosome somatic (2N) number is 22 in common with other *Phaseolus* spp. The pods are freely parasitized by a small native weevil.—K.J.S.

Akamine, E. K. **Effect of 2, 4-dichlorophenoxyacetic acid on root development in bean cotyledons.** *Science* **108.** 209. 1948. [Hawaii Agric. Exp. Sta.] **254**

Following the observation that cotyledons of garden beans (*Phaseolus vulgaris*) developed roots when growing in soil treated with 2, 4-D, separated cotyledons of bean, variety Bountiful, were planted in soil dusted with 2, 4-D (5 lb. per acre of 95 per cent acid). To ensure that roots could not develop from axillary buds in the embryo the germ end of each cotyledon was removed. Roots were developed on about half the cotyledons planted; no roots were developed in controls planted in untreated soil. Grown in Petri dishes containing 2, 4-D solutions and kept at different temperatures, cotyledons rooted most readily at 2-8 p.p.m. of 2, 4-D at room temperature. At 84-93°F. they rooted most readily at 1-4 p.p.m.—K.J.S.

Cornell University Agricultural Experiment Station. Memoir 279. **Symbiotic segregation of strains of the root nodule bacteria by leguminous plants.** By *J. K. Wilson.* 1948. pp. 23. **255**

The laboratory procedure was to expose growing seedlings of a legume species, e.g. *Amorpha fruticosa* simultaneously to two or more strains, e.g. to strains from *Virgilia capensis* and to two from *Wisteria chinensis*. The nodules that appeared were then bioassayed to ascertain which strain was the cause of each nodule. Sixty-six strain combinations were studied. It was found, depending on the strain employed that the legume will symbiose with only one of the strains or with two or more simultaneously. In some combinations the plant did not bear nodules after exposure to the strain derived from it, but was compatible with the companion strain from another genus or species. The significance of the segregation effect is discussed.—K.J.S.

КЛЕЧКОВСКИЙ, В. М., ИВАНЕНКО, Д. Д., БАГАЕВ, В. Б., и РАЧИНСКИЙ, В. В. Распределение фосфора в органах растения в опытах с радиоактивным изотопом P^{32}. *Доклады Акад. Наук СССР.* Том 58. *No.* 1. стр. 93-5. 1947.

Klečkovskiĭ, V. M., Ivanenko, D. D., Bagaev, V. B., and Račinskiĭ, V. V. [**Distribution of phosphorus in plant organs in experiments with the radioactive isotope P^{32}**] *Doklady Akad. Nauk SSSR.* **58.** 93-5. 1947. [Timirjazev Agric. Acad., Moscow] **256**

The exceptionally high mobility of phosphorus in the plant organism has been demonstrated by the work of Hevesy and others (*Nature, Lond.* 137, p. 66, 1936, and ibid. 139, p. 149, 1937). The present study is concerned with the nutrition of the soybean, with special reference to introduction of "labelled" phosphorus (term used by Hevesy *et al.*) on the character of P distribution in the plant and on the relationship $P^{32} : P^{31}$ in different organs. There is indication that the distribution of radioactive phosphorus depends on the nutritional condition of the plant. Thus, under a moderate P supply when the plant reaches the limits of manifest P starvation, the relation between the general amount of P and the content of radioactive P in the different organs is quite diverse. It is therefore postulated that whenever this relationship shows uniformity, it is due in part to the experimental plants having been grown previously in a complete nutritive medium. The need for considering former growth conditions in plants used for experiments of this type is stressed. —M.H.

ЛЕОНТЬЕВ, И. Ф. Витамины соевых бобов. *Природа, Москва* 1948. *No.* 5. стр. 37-8.

LEONTJEV, I. F. [**Vitamins of soybean.**] *Priroda, Moskva* 1948. No. 5. 37-8. **257**

A review is given of the work of Wai and others (*Field Crop Abstr.* 1, Abs. 282) and of Desikacher (*Ann. Biochem. exp. Med.* Vol. 6, pp. 49 and 57, 1946).—M.H.

HOLMAN, R. T. **Lipoxidase activity and fat composition of germinating soybeans.** *Arch. Biochem.* **17.** 459-66. 1948. **258**

The changes in fat content, iodine number of fat, linoleic and linolenic acid contents of the fat, chlorophyll and carotenoids, lipoxidase and catalase have been followed during the germination of soybeans.

Carotenoids begin to increase on the fifth day, chlorophyll on the seventh. Fat content shows a decrease after the third day, iodine value of the oil decreases after the fifth day. Linoleic acid and linolenic acid contents decrease after the second day and the loss of these acids is proportionately greater than the loss of total fat.

Catalase activity shows a very sharp maximum at the fourth day. Lipoxidase activity declines sharply after the second day, at the time its substrates begin to disappear. It may be that the function of lipoxidase is to initiate the oxidation of linoleic and linolenic acids which then can proceed autocatalytically.—Author's summary.

DUNN, M. S., CAMIEN, M. N., SHANKMAN, S., and BLOCK, H. **Amino acids in lupine and soybean seeds and sprouts.** *Arch. Biochem.* **18.** 195-200. **259**

Twelve amino acids have been determined by microbiological methods in seeds, etiolated seedlings, and plants of *Lupinus angustifolius* and soybean (Illini M 13). The most marked changes which occurred in etiolated seedlings grown in moist sand in the dark were increase of aspartic acid (asparagine) and decrease of all other amino acids except histidine. Total amino acids of plants grown in garden soil under natural conditions increased although the individual amino acid changes relative to the other amino acids were less than those which occurred in the dark.—From authors' summary.

OIL CROPS

BUNTING, E. S. **Oil seed crops in Great Britain.** *Ann. appl. Biol.* **35.** 132-3. 1948. **260**

Semi-dwarf (4-6 feet) sunflower varieties Pole Star, Jupiter, and Russian strains mature in 4 months and contain 33-37 per cent oil on dry weight. Klein is at least a month later, is taller and has slightly lower oil and protein content. Sowing date: March to mid-April. Spacing: 4 plants per sq. yd. for Klein, 8-10 plants per sq. yd. for Jupiter and Pole Star. Oil content is greater in seed from close spaced crops.

Experimental crops of oil poppy, var. Peragis and Mahndorfer ripened in 1946 and 1947 and yielded up to 19 cwt. per acre seed and 49 per cent oil. Optimum plant density is 30-36 plants per sq. yd. Very low seed rate and shallow sowings are requisite.

Linseed variety trials over 7 years have shown American and Canadian varieties to be superior to La Plata, compared with which Royal, Bison and Redwing are taller and less branched. They are earlier, easier to harvest, and heavier cropping. Oil content 40-43 per cent of the seed dry weight, protein 25-26 per cent. Redwing is recommended for northern Britain. Complete manuring gave an average yield increase of 8 per cent nitrogen often increasing significantly the number of capsules per stem. For drill widths of 6-7 in., the sowing rate is 60 lb. per acre; for drill widths of 4 in., the rate is 80 lb. per acre. Cross drilling is preferred.—K.J.S.

WESTERMARCK, N. Kasviöljyjen tuotanto taloudellisena tekijänä Suomessa. [**The production of vegetable oils as an economic factor in Finland.**] *Suom. Maataloust. Seur. Julk.* **58.** 1-121. [English summary, pp. 116-21] 1945. **261**

In Finland in 1942, when the cultivation of oil plants for economic purposes was initiated, the total area of cultivation of these crops was 395 ha.; in 1943 it had increased to 2,286 ha., in 1944 to 4,069 ha., and in 1945 to 4,720 ha. Calculations show that even under Finnish conditions the oil plants tested (oil flax, fibre oil flax, poppy, yellow mustard) produce considerably more fat per ha. than do other sources of fat production. They also indicate that costs of production of vegetable oil are considerably lower than those of animal fat. The requirement of man labour is likewise smaller.

The conclusion reached is that it would be advisable to maintain the cultivation of food vegetable oil-producing plants, above all that of yellow mustard, possibly even to an extent corresponding to the consumption of raw vegetable oils. —R.P.J.

Crocioni, A. Le piante oleifere nell' agricoltura italiana. [**Oil plants in Italian agriculture.**] *Ital. agric.* **No. 7.** pp. 10. 1946. **262**

In Italy cultivation of herbaceous oil plants is hindered by limitation of soil already occupied by other crops, and by competition of imported products. Nevertheless, practical experience and 4-years' trials carried out by the Institute of General Agronomy of the Bologna University have shown that the best herbaceous oil plant, for Italian conditions, is sunflower, followed by soybean. This latter crop can be grown during summer after wheat. Sunflower gives good results in consociation with potato.—E.B.

Crocioni, A. Aspetti e problemi della coltura del girasole. [**Aspects and problems of sunflower cultivation.**] *Olearia* No. 5. pp. 8. 1947. **263**

Sunflower is cultivated in Italy only to a small extent, in consociation or in marginal areas. The convenience of introducing this crop as a spring-summer crop is considered. For economic value sunflower is compared to maize as they occupy the same place in rotation, before wheat (" colture da rinnovo "). In the plain of the Po, best time of sowing is the second half of March. Cultural requirements and characteristics of this plant are reviewed. A genetical improvement in order to obtain some good varieties from the multiform material present in Italy, is essential. Early varieties should be preferred in order to harvest about the middle of July thus avoiding part of the summer drought. Sunflower can also be grown as a forage plant and gives good ensilage.—E.B.

Alchourron, R. H. La Argentina como país productor de lino. [**Argentina as a producer of oil flax.**] *Granos* **10.** Nos. 7-9. 12-4. 1946. [Dir. Cereales, Lino y Forrajes Min. Agric., Argentina] **264**

A radio address outlining Argentina's position in the world linseed market. The 1943 area had fallen to the relatively low figure of some 2 million ha. but a trade agreement with the U.S.A. and a Government guarantee of increased price would, it was hoped, stimulate increased production.—G.M.R.

Perez, C. G. El cultivo del lino en el partido de Necochea. [**Oil flax growing in the Necochea region.**] *Granos* **10.** Nos. 7-9. 50-2. 1946. [Dir. Agron. Reg., Min. Agric., Argentina] **265**

A radio address. Circumstances rather than regional suitability have led to the increased growing of *Linum usitatissimum* in the Argentine district in question, with good results. In some cases the flax has been sown in a mixture with ryegrass, satisfactory grazing leys being thus obtained after the harvesting of the linseed. The varieties used are listed. An experiment in growing flax for fibre is considered promising.—G.M.R.

Revista de Agricultura, Costa Rica. La producción de oleaginosas en Costa Rica. [**The production of oil plants in Costa Rica.**] *Rev. Agric. Costa Rica.* **20.** 74. 1948. **266**

The production of oils and fats in Costa Rica increased by 405 per cent in 1947. This was largely due to the energy of an oil-mill company which, being deprived for economic reasons of raw material from neighbouring countries, distributed the seed of oil plants such as cotton, sesame, sunflowers and others among Costa Rican farmers and supplied them with technical assistance. Farmers are urged to increase the growing of oil plants, which is profitable, but in rotation with other crops.—G.M R.

Crocioni, A. Il girasole in seconda coltura. [**Sunflower as a catch crop.**] *Ital. agric.* **85.** 1948. **267**

In Italy sunflower cultivation could be increased if it could take place, as a catch crop, during summer-autumn after wheat, thus not replacing a principal crop. By work of genetical improvement, varieties with a vegetative period of 105-110 days have been obtained. These varieties, sown early in spring, ripen about the middle of July. The author has carried out at the experimental farm of Corticella (near Bologna) a trial of growing these varieties during the summer. A comparison plot was sown with soybean which was cultivated as a catch crop. Two small irrigations were given. Sowing of sunflower took place on the 2nd of July, flowering started the 22nd August and ripening took place between 20th and 30th September The vegetative period was thus shortened to 80-90 days but the development of grains appeared to be normal.

Other oil plants (soybean, *Camelina*, white mustard, *Carthamus*) when grown in summer cultivation have a shorter vegetative period than when grown in spring-summer, and a normal ripening of the seed ; *Madia* has a slightly longer vegetative period, if grown in summer, and normal ripening. Spring colza, poppy and linseed, grown in spring-summer cultivation have a vegetative period of the same length of the previous plants, but grown as a second crop during summer are not able to start fructification.—E.B.

Lagos U., J.A. Cultivo del girasol. [**Cultivation of the sunflower** (*Helianthus annuus*).] *Rev. Agric. Costa Rica* **20.** 166-7. 1948. [Esparta, Costa Rica] **268**

Directions for sunflower growing in Costa Rica. The necessity for crop rotation is stressed. —G.M.R.

WIND, J. Verslag van de in het jaar 1943 door de Rijkslandbouwconsulenten genomen veldproeven met koolzaad. **[Report on the field trials of colza conducted by the Netherlands Agricultural Advisers in 1943.]** *LandbVoorlDnst Med.* No. 39. 1944. pp. 43. [Cent. Inst. Agric. Res., Wageningen, Netherlands] **269**

The trials ,conducted in the various regions of the Netherlands under the supervision of twenty Agricultural Advisers and collaborators, threw light on varietal performance under various regional conditions. The mild winter put little strain on winter hardiness. Special experiments were concerned with date of sowing (in 21 places); the application of nitrogen and its effect on yield (increased) and the fat content (reduced) and protein content (increased) of the seed; seeding rate (approximately 125 to 150 seeds per sq. m. recommended) and planting distance (50 to 100 plants per sq. m. recommended).—G.M.R.

BJORKLUND, C. M. Inför sådden av höstoljeväxter. **[On the eve of sowing autumn oil crops.]** *Svensk Frötidn.* **17.** 89-90. 1948. **270**

In trials to compare autumn-sown varieties of rape (*Brassica napus* var. *oleifera*) and "rybs" (*B. rapa* var. *oleifera*), the former has given a decidedly higher yield, as is shown by the accompanying table.

Comparison between different varieties of autumn *B. napus* var. *oleifera* and *B. rapa* var. *oleifera* 1944-1947.

	No. of trials	Seed yield kg./ha.	Seed yield rel. no.	Crude fat rel. no.	Crude protein rel. no.
Late rape	10	1647	100	100	100
Late rape B	10	1841	112	113	111
Lembkes rape	10	2199	134	146	127
Lembkes "rybs"	10	1638	99	96	96
Rapido "rybs"	8	1256	74	68	70

The superiority of rape appears to be greatest in Scania. Lembkes autumn rape has given the highest yield. Late rape B was slightly more winter-hardy and constitutes a great advance on the older varieties of late rape, but as its yielding capacity is distinctly poorer, Lembkes rape should be the first choice. The few trials which have been conducted with different dates of sowing autumn oil crops indicate that autumn rape should not be sown later than the middle of August. In some trials sown on 1 September the yield was reduced by half. Autumn "rybs" can be sown at the beginning of September without an appreciable reduction of yield. Too early sowing appears in certain years to be detrimental. Many of the fields sown at the end of July and at the beginning of August 1947 were completely or partially winter-killed. From 12-15 August is a suitable time to sow autumn rape. This crop is cultivated with good results up to the Målar valley and grows well on the majority of soils except those which are acid and lime-deficient. It can be grown after bare fallow, green fodder, leys or autumn-sown cereals. Root crops should not be grown before or after rape. The trials indicate that an application of 800 kg. calcium nitrate per ha. is economic: this large dose of N should not be given before the spring. For autumn rape 6-10 kg. per ha. and 5-8 kg. for autumn "rybs" are considered to be suitable rates of seeding. A distance between the drills of 45-50 cm. can be recommended.—R.P.J.

ENGLAND AND WALES, Ministry of Agriculture and Fisheries 'Growmore' Leafl. No. 96. **Linseed harvesting and thrashing. n.d.** pp. 4. [Mimeographed] **271**

For successful harvesting the first essential is to grow an uniform crop and to let it ripen properly before starting to harvest. The harvesting method recommended is to cut with a binder, stook, stack, and thrash with a standard machine. Careful adjustment of the binder and thrasher is necessary. A combine harvester may be used with suitable crops if the operator is experienced, but the method is not recommended for general adoption.—G.M.H.

PAATELA, J. **On the possibilities of growing oil flax in Finland. On the quality of Finnish linseed oil and some factors affecting it.** *Acta agral. fenn.* **68.** 1-106. 1947. [Dept. Crop Husbandry, Cent. Agric. Exp. Sta., Tikkurila, Finland] **272**

The purpose of this study was to determine the quality of linseed oil produced in Finland. The material was taken from experiment cultures grown from 1939 to 1946 between Tikkurila (60° 17′N.) and Rovaniemi (66° 35′N.), where the quality of the oil is greatly influenced by climatic conditions during the growing season. Experiments concerned the following: dates of seeding, germination, after-ripening, frost, dates of harvesting, irrigation, and varietal trials.

The cold pressure method was used to obtain oil from about 80 grm. ground seeds. The following characters were determined: iodine number (Hanus), refractive value (Abbe's refractometer), acid number, colour (Pulfrich's photometer), relative oxidation number and the rapidity of oil drying. The iodine numbers of Finnish linseed oil produced under normal temperature should average 199 (Argentine) and 202 (Concurrent). The average iodine number of linseed oil varied by 0 to 9 units, in individual localities even by 14 units. A highly significant positive correlation was found between iodine number and refractive number.

Precipitation and the relative moisture of the air were found to be significantly and positively correlated with acid number. As the growing season in Finland is short and the autumn often cool and rainy, the best means of producing as neutral an oil as possible is by early seeding.

In order to produce in Finland sound seeds and as unsaturated, neutral and light linseed oil as possible, early-maturing varieties must be grown. Of much interest is a new Finnish variety, Ti 0774, with high oil content and ripening 8 days earlier than Argentine linseed.—O.V.

WITNEY, D. **Linseed costs and returns, 1947: an example from Fife.** *Fm Econ.* No. 15. 1948. pp. 9-10. [Edinburgh and East Scot. Coll. Agric.] **273**

This record of 5.75 acres of linseed grown on a farm in Fife reveals a profit of £53 8s. 0d. or £9 5s. 9d. per acre. This does not include any return from the straw which might have been sold at about £5 per ton (a yield of straw of 30 cwt. per acre could have been expected). Harvesting and threshing proved difficult, and the latter operation called for labour at a time when potato harvesting was in progress. The crop threshed out at about 13.25 cwt. per acre and on analysis proved to be satisfactory from a commercial standpoint.—T.G.J.

FAJERSSON, F. Betningsförsök med vallmofrö. [**Trials in disinfecting poppy seed.**] *Svensk Frötidn.* **15.** 102-5. 1946. **274**

In Sweden germination tests and a small pot trial were conducted in 1945 at the Institute of Crop Husbandry of the College of Agriculture, when the effect of different disinfectants was investigated. The germination tests show clearly that the disinfectants Uspulun, Granosan and Arasan in doses of 2-4 grm. disinfectant per kg. poppy seed cause an increase of germination in fungus infected seed. Higher doses do not increase the germination, but are able through increased fungicidal effect to contribute to keeping the poppy stand free from fungus infection, which is present in the seed. The highest dose tested in the trials, 16 grm. per kg. seed, causes a depression in germination relatively to the other doses. Granosan causes the most pronounced depression in germination with over-dosing. The pot trial shows that over-dosing causes a reduction in the number of plants.—R.P.J.

TIDSKRIFT FÖR LANTMÄN Försök med hormonpreparat på Dickursby. [**Experiments with hormone preparations at Dickursby, Finland.**] *Tidskr. Lantm.* **30.** 145-6. 1948. **275**

In experiments with oil flax different preparations and different concentrations of the same preparation were tested. In general the sections treated with 1 to 1.5 per cent Agroxane showed good results. English preparations proved most effective. The best time of treatment for flax is when the plant has attained a height of 5 to 15 cm. Experiments were also carried out with fibre flax sown at different dates: results were very similar to those obtained with oil flax. Some weeds (among them *Viola tricolor* and *Spergula arvensis*) proved to be immune to the preparations, while others including *Taraxacum officinale* and *Sonchus oleraceus*, were completely destroyed.—R.P.J.

HOLLY, K. **Control of weeds in oil seed crops.** *Ann. appl. Biol.* **35.** 133-4. 1948. **276**

Common annual weeds in flax are killed by M.C.P.A. and D.C.P.A. (phenoxyacetic acid derivatives). It is safe to spray flax when over 3-4 in. high with 0.2 per cent solution of M.C.P.A. and 0.1 per cent of D.C.P.A., either as free acid or sodium salt, both supplied at the rate of 100 gallons spray per acre. The ethyl ether of D.C.P.A. in oil water emulsion is highly toxic to linseed. There is some slight adverse effect on oil content of seed. —K.J.S.

ПАНЧЕНКО, А. Я. Роль корня и надземной части подсолнечника в устойчивости к заразихе. *Доклады Акад. Наук СССР.* Том 58. *No.* 5. стр. 911-3. 1947.

PANČENKO, A. Ja. [**Role of the root and underground parts of sunflower in resistance to *Orobanche*.**] *Doklady Akad. Nauk SSSR.* **58.** 911-3. 1947. [All-Union Sci. Res. Inst. for Oil Crops, Krasnodar] **277**

In spite of successful selection of types of *Helianthus annuus* resistant to attack by *Orobanche*, there is little knowledge on the physiology of this immunity. In 1945 experiments were started at the above Institute to elucidate the problem. Two sunflower varieties comprised material of the tests. They were A-41, race B, highly susceptible to *Orobanche*, and No. 6196, resistant to parasite attack. These two were grown under specified conditions and grafted on to each other so that the roots were in two separate series of containers while the tops comprised the resistant variety on susceptible roots in one series, and on resistant roots on the other. The same varieties, not grafted, were used as controls. The roots of the resistant line with above-ground parts of the susceptible variety retained their immunity, and roots of the susceptible variety did not have any less degree of damage as a result of the grafting. Thus there is no indication of the sound graft influencing the stock damaged by the parasite. Further tests were made in 1946 to study doubtful aspects of the earlier experiment, but it is finally concluded that in sunflower root damage by *Orobanche* is independent of graft characteristics, and that resistance is entirely determined by the root, and not by the upper parts of the plant.—M.H.

GUILLAUME, M. A. Sur les moyens de lutte à employer contre les insectes parasites des crucifères oléagineuses. [**Methods employed in the control of insect pests of oil-bearing Cruciferae.**] *C. R. Acad. Agric. France* **34.** 96-8. 1948. **278**

SEN GUPTA, J. C., and KUMAR SEN, N. **Photoperiodic effect on** *Sesamum indicum* **Linn.** *Sci. and Cult.* **13.** 203-4. 1947. [Presidency Coll., Calcutta] **279**

The results of a preliminary experiment on the photoperiodic effects on Sesamum (*S. indicum* Linn) are reported. Seeds of a late maturing Indian sesamum I.P. 29 were sown in earthenware pots on 1st June, 1944. There were 4 plants in each pot and 5 pots per treatment. One of the set was exposed to short photoperiod of 10 hours for germination and the other set was allowed to grow in normal light period. Results are summarized in the following table :—

Treatment	Time of bud initiation (in days)	Time of flower initiation (in days)	Height in cm. at flowering time
Normal light (13 hr. 28 min.—12 hr. 34 min.)	68.1	91.6	121.8
10 hr. light period	26.2	43.1	50.2

Short photoperiod thus induced early flowering with lesser vegetative growth in sesamum.—G.M.H.

ЛЕОНТЬЕВ, И. Ф. Химия масла из семян арбуза. *Природа, Москва* 1948. *No.* 5. стр. 37.

LEONTJEV, I. F. [**The chemistry of oil from seed of** *Citrullus edulis*.] *Priroda, Moskva* 1948. No. 5. 37. **280**

The Soviet Union has the largest sown area of Cucurbitaceae in any country, and *Citrullus edulis* occupies a wide area. Apart from the food and fodder values of this crop, the seed may be of importance as a source of oil, both edible and industrial. Interest has been shown in the Indian and Californian work on chemistry of *Citrullus* oil. A comparison of the Indian *Citrullus* index figures (acid no. = 0.9 ; iodine no. = 117.1) with those obtained for *Cucumis sativus* from India, Africa and southern Russia shows that the oil of Indian *Citrullus* is distinct from that of *Cucumis* from the other sources indicated. It is considered possible also that oil of *Citrullus* seed may replace that of almonds.—M.H.

MENDES, A. J. T. Estudos citológicos no gênero *Arachis*. [**Cytological studies of the genus** *Arachis*.] *Bragantia* **7.** 257-67. [English summary, p. 265.] 1947. [Dept. Prod. veg., São Paulo, Brazil] **281**

See *Plant Breed. Abstr.*

FIBRE CROPS

BULLETIN OF THE EGYPTIAN EDUCATION BUREAU **Cotton.** *Bull. egyp. Educ. Bur.* No. 26-27. pp. 55-6. 1948. **282**

There are 11 varieties of Egyptian cotton, some of which are no longer in cultivation. Amoun was introduced in 1944 and is the best spinning Egypt cotton yet produced. It is $\frac{1}{8}$ in. shorter in staple than Montserrat Sea Island, but gives stronger yarn in all counts and is white to a degree unusual in Egyptian strains. Karnak was introduced in 1939 and at present is the bulk production of the Egyptian Delta. It is a long staple type. Other varieties are Menoufi, Giza 7, Giza 23, Giza 30, Ashmouni and Zagora. Numerous cotton statistics are given in tabular form.—G.M.H.

AHMAD, A. A. **The effect of the electrification of the Aswan Dam on cotton cultivation.** *Bull. egyp. Educ. Bur.* No. 26-27. pp. 25-8. 1948. **283**

Development of the Aswan Dam hydro-electric scheme will favourably influence the cultivation of cotton in Egypt in two ways : the production of nitrogen fertiliser in Egypt will considerably increase the crop, and the use of electricity for irrigation from artesian wells will enable the area of cotton cultivation to be extended. —G.M.H

VALLE, O. Kuiduntuotannon kehityksestä maassamme. [**The development of fibre crop production in Finland.**] *Kotiteollisuus* 1947. No. 4-5. pp. 2. [Professor, Cent. Agric. Exp. Sta., Tikkurila, Finland] **284**

Fibre plants were grown in Finland before the war, principally flax but also hemp, in larger areas than in the other Scandinavian countries. In 1935, for example, the fibre crop area was 4850 ha. ; in the present decade it is nearer 6000 ha. The greater part of the harvest is processed by the growers themselves, as only one processing factory exists in the country. The retted and swingled thread is spun for a large part at Finland's great spinning mills at Tampere. During the present decade, the State has requisitioned 25 per cent of the spun material. The mechanical processing of flax has not been developed to the same extent in Finland as it has in Sweden and Denmark during the present decade.—O.V.

KUGLER, W. F. El mejoramiento del lino oleaginoso y textil en la Argentina. [**The breeding of oil and fibre flax in Argentina.**] *Granos* **11.** 3-34. 1947. [Director, Min. Agric. Exp. Sta., Pergamino, Argentina] **285**

An historical outline of flax growing in Argentina and of breeding work by Boerger and Fischer in Uruguay and by Klein, Brunini and others in Argentina precedes a full account of work done and in progress at the Pergamino Experiment Station, Argentina. Research is centred principally in efforts to solve the " permanent problems " of the Argentina flax grower, which are the wilt caused by *Fusarium lini*, seedling diseases caused by *Rhizoctonia solani* and *Pythium ultimum*, rust caused by *Melampsora lini*, the disease caused by *Sphaerella linorum*, and damage caused by insect larvae (unspecified). An encouraging amount of progress has been made in obtaining varieties resistant to the fungous diseases mentioned, although much remains to be done in the case of that caused by *Sphaerella linorum*, but the " isoca " or insect problem is still practically unsolved. Argentine climatic conditions are discussed in relation to the various problems and to the different varieties and their behaviour. Finally, the yield and quality of seeds and fibre respectively are considered.—G.M.R.

BARI, Agricultural Experiment Station. Mem. No. 38. Publ. No. 276. Prove di culture irrigue nell'azienda sperimentale di Foggia. [**Trials on irrigated crops at the Foggia experimental farm.**] By *G. Potenza* 1947. pp. 36. **286**

Irrigation trials have been carried out at the Foggia experimental farm on the following industrial plants: hemp, *Sesamum*, and *Ricinus*. Data of water supplies and yields obtained are given.—E.B.

WAGENINGEN, Government Committee for the Compilation of the List of Varieties of Field Crops. **Flax varieties. 1948.** pp. 8. **287**

An English version of the chapter on flax in the Netherlands 23rd official List of Varieties. Flax varieties recommended for use in the Netherlands and for export are described and a comparative survey of varietal characters is presented.—G.M.R.

MEDINA, J. C., AGUIRRE, Jnr., J. M., and CORREIA, F. A. Estudo agrícola-tecnológico de diversas variedades de *Phormium tenax* Forster. [**Varietal study of New Zealand flax** (*Phormium tenax*).] *Bragantia* **7.** 231-41. [English summary, pp. 240-1.] 1947. [Dept. Prod. veg., São Paulo, Brazil] **288**

Six varieties of *Phormium tenax* normally grown in the Brazilian State of São Paulo were planted 1 m. apart at the Jundiai Experiment Station in 1944 and were studied in 1946 for development of fans, leaf production, length of leaf, yield of fibre, fibre analysis (dimensions, 10 cm. weight, tensile strength and resistance to torsion, etc.), and chemical composition of the fibre. The data obtained are tabulated, and indicate that marked varietal differences exist.—G.M.R.

DANSK FRØAVL Svenske Hørforsøg. [**Swedish flax trials.**] *Dansk Frøavl* **31.** 119. 1948. **289**

One single trial with hand pulling and machine pulling of flax in 1946 gave a slightly higher seed yield for hand pulling owing to less shedding of seed than with machine pulling. The yield of straw was somewhat lower, as the machine removed some weeds and short stems. On the average of 8 trials in 1944-46 hand pulling gave 4340 hkg. straw per ha. and machine pulling 230 kg. more. The seed yield was 920 kg. for hand pulling and 100 kg. less for machine pulling. Seed yield was increased slightly by a delay in date of pulling. —R.P.J.

SEDLAČEK, J. Zkoušky a předvádění trhacích strojů na len. [**Trials and demonstrations of flax pulling machines.**] *Věstn. čes. akad Zeměd.* **22.** 383-93. [Czech and Russian summaries, p. 393] 1948. **290**

The efficiency of foreign made machinery was compared with that made in Czechoslovakia, and also with the efficiency of manual harvesting. Their rentability, theoretical and practical, width of action, power economy and output are tabulated. Tests were made on standing and lying flax. All types of foreign make were rejected as unsuitable for conditions in Czechoslovakia. Suggestions for improvements on home made machinery have been made and it is hoped that improved machinery will secure the harvest on the increased acreage, as demanded by the 5-year production plan.—K.A.A.

AFZAL, M. **Problems in cotton improvement in the Punjab. III. Improvement in ginning outturn and staple length.** *Indian Cott. grow. Rev.* **2.** 73-83. 1948. [Cotton Res. Lab., Lyallpur (Pakistan)] **291**

Ginning outturn is a complex character depending upon the weight of seed and the fibre borne on it. Since it is only a ratio its mode of inheritance is extremely complicated, but it appears from the examples quoted that selection will be a fruitful line to pursue in several strains at present under cultivation in the Dominion of India.

The chances of improving the staple length of locally grown *desi* cottons by selection are practically non-existent. Any improvement in this direction must therefore be made by hybridization. A table shows the results of crossing 39 Mollisoni with Chinese Million Dollar in 1930. Of the large number of strains, collectively called Jubilee, which have been produced D.C. 17 appears to be the best. Jubilee has also been crossed with wild Nigerian cotton, *Gossypium anomalum*, in order to bring about still greater improvements in the length and fineness of the staple. The results of field trials of the derivatives of this cross are presented in a table from which is seen that a stock of *desi* varieties is now available which have a spinning performance as good as Punjab—American 4F.

It is evident that *desi* cottons capable of spinning 40's and above will never be produced in the Western Punjab and four years ago efforts were made to improve the American varieties. Final results are not available but very good progress has been made.—G.M.H.

ŠPALDON, E. Konope v budúcom 5 ročnom víjrobnom pláne. [**Hemp in the future 5-year production plan.**] *Slov. pôdohosp.* **3.** 9-13. 1948. **292**

In Slovakia and parts of Moravia hemp has been cultivated mainly for home use and the industries had to import their requirements from abroad. The demand for new industrial plants in replacement of others like beet and wheat brought hemp into the foreground again. In 1933 a decree granted every hemp grower fulfilling certain conditions a government subsidy of K 30 (3s.) for 100 kg. of dried hemp stalks and K 40 (4s.) for soaked or moistened hemp stalk on delivery. Several co-operative societies were formed to aid the hemp grower with the processing of the raw material and in 1937 considerable development in the cultivation of hemp was recorded in Slovakia. The average yield per hectare was then 50 q. of hemp stalks.

The present 2-year plan demands cultivation of hemp on 5000 ha. but this area had to be reduced to 2000 ha. The present acreage is estimated at 700 ha. but present processing plants could deal with the produce of about 1075 ha.

The future 5-year plan aims at centralisation of the hemp industry in Slovakia. This could be achieved by a transfer of surplus processing plants from Moravia, where insufficient labour and raw material left them idle. It is hoped that hemp cultivation on 5000 ha. will be reached in 1953.

The present situation makes it impossible to compete with much cheaper material imported from Italy, and the author appeals to the Government and industry to support the hemp grower with subsidies. Production costs must be reduced by intensification of mechanisation and by increasing the yield per ha.—K.A.A.

SHEN, W. F. **The increase of cotton production amidst economic maladjustments.** *Mon. Fmrs' Bank China* **9.** 3-4. 1948. **293**

As a result of wars, famines and other calamities, China has dropped from third to fourth place in world cotton production. In 1936 cotton output was 1,700 million piculs, or about 12 per cent of the world total. This year the output is but 10 per cent of the world total. Increased production per unit area and an expansion of the average under cotton is considered essential for the future development of Chinese cotton production.—G.M.H.

TOBYÁŠ, J. O situaci ve lnářství a devouletý plán. [**The situation in the flax industry and the 2-year plan.**] *Vestn. čsl. Akad. Zeměd.* **22.** 163-8. 1948. **294**

The Czechoslovak flax industry is at present under a severe production crisis. The economic importance of the home production demands greater development now and in the future.

To fulfil the requirements of the 2-year plan immediate action is necessary and the following terms are being put to the committee:

1. The assurance of rentability of flax-growing through public subsidies. 2. A price increase of flax seed and an increase to 60 per cent of returnable shredding soon after delivery of seed. 3. The safeguarding of full support of research into the improvement of quality of the products, mechanization and rationalisation of production. 4. To commandeer during harvesting cheap labour or free the school children or form special work brigades equipped with the necessary machinery, and adjust pay by results. 5. To make good production losses through drought by public funds payments to flax growers.—K.A.A.

ARGENTINE REPUBLIC, Secretaria de Industria y Comercio, Dirección de Algodón. La producción mundial de algodón. [**World production of cotton.**] *Bol. mens. Dir. Algodón* Nos. 139-40. pp. 423-4. 1946. [Received 1948] **295**

A comparative survey is presented of the amount of cotton (in tons) grown in the different parts of the world from 1935-36 to 1944-45, with an estimate of production in 1945-46. A total reduction was forecast of approximately 33.4 per cent compared with the average production for 1935-39, mainly due to a reduction of 600,000 tons in the U.S.A. An increased production was expected in most of the southern hemisphere, with the exception of India and Mexico. Reasons for increases or decreases in the various cotton-growing countries are discussed.—G.M.R.

Foreign Commerce Weekly. **Current world cotton situation: developments and prospects.** *Foreign Comm. Wkly* **31.** 11-12, and 47. 1948. **296**

World production of cotton for the 1947-48 season is expected to be about 16 per cent more than in 1946-47, but 15 per cent less than in 1938-9. Most of the increase has occurred in the United States. The expansion in world cultivation of cotton since the war has been slower than was generally expected mainly because of the need for food. State action and the generally more favourable prices have both had their effect in this direction. The tendency for the production of medium staples to expand has continued. Most countries which have produced short staples now have quality-improvement programmes. World consumption in 1947-8 is estimated as about the same as for the preceding season. Stocks which were at a record level at the end of the war have been reduced to about half a year's needs. Cotton prices have naturally increased over those of pre-war. Competition has not, however, been as important, owing to better arrangements and control measures. Prices are now higher than corresponding rayon prices; as markets for textile fibres become more competitive, price competition between cotton and rayon is likely to be intensified. World trade has fallen below the amount last year, and the level is likely to be less than 9,000,000 bales, as compared with approximately 13,000,000 bales before the war. Among the factors affecting the volume and pattern of world trade in raw cotton are export availability and import ability; shortage of dollar exchange being the dominating influence on imports into Europe and East Asia. Of longer term significance are the development of cotton-manufacturing in the producing and exporting areas and increased rayon production in cotton-importing countries. To some effect these developments may be offset by increased population and higher standards of living.—T.G.J.

Pehrson, J., and Fajersson, F. Betningsförsök med linfrö. [**Experiments in disinfecting flax seed.**] *Svensk Frötidn.* **13.** 138-42. 1944. **297**

Germination tests carried out at the Institute of Crop Husbandry of the College of Agriculture, Sweden, indicated that disinfecting of flax seed causes an appreciable increase in germination. The averages of increase of germination for the trials reported were 2.7, 5.1 and 4.7 per cent after respectively 1, 2 and 3 years storage. Disinfection caused an increase of rate of germination of more than 8 per cent for year-old seed. In seed which had been stored for 2 years or longer, disinfecting was not followed by any change in rate of germination. Mould attack in disinfected flax declined by 6-8 per cent. A certain increase in the number of abnormal growths was caused through disinfecting. This increase was compensated for by the decrease in the number of decayed seed after treatment. The germination tests show that germination of flax declines as the seed becomes older. Results indicate that flax seed should always be disinfected. They also illustrate that old seed should not be used, if new seed is available. Pot trials which were conducted show *inter alia* that the stimulating effect of the disinfectant does not entail any better development of the surviving plants.—R.P.J.

Decker, A. E. and Reitz, L. P. **Germination tests with flax stored at different moisture and temperature levels.** *Proc. int. Seed Test. Assoc.* **14.** 27-34. 1948. [Kansas Agric. Expt. Sta.] **298**

Flax seed cannot safely be stored at 86°F. at moisture levels of 9 per cent or above and maintain viability except for a very short time. Mould growth was apparent in early samplings. Moisture content above 11 per cent was associated with rather rapid decline in viability after about 90 days in storage at moderate temperatures. Storage at a temperature of 40°F. maintained viability best at all three moisture levels, and no mould growth was noted.

Readings on tests after 4 days in the germinator appeared to be a better indication of expected field results than the 8-day test. Testing of flax seed between blotters gave the same results as testing on top of blotters and was more efficient in use of germinator space.—From author's summary.

Rothmaler, W. Artentstehung in historischer Zeit, am Beispiel der Unkräuter des Kulturleins (*Linum usitatissumum*). [**Origin of species within historical times, as illustrated by the weeds of cultivated flax** (*Linum usitatissimum*).] *Züchter* **17/18.** 89-92. 1946. [Institute for Research in Cultivated Plants, Gatersleben] **299**

Flax has few weeds. This may be due to careful preparation of the ground, late sowing on weed-free ground, and to the essential hoeing of the crop. Such weeds as are present must have as short a vegetative period as flax itself which completes its life in 3 or 4 months. The chief weeds of flax in western, central and southern Europe are species of *Silene*, *Camelina*, *Lolium*, and *Spergula* and in Eastern Europe *Polygonum linicolum* and *Agrostemma linicola*. The weeds closely resemble *Linum usitatissimum* in form. To illustrate this fact a table sets out for comparison the morphological features of wild and cultivated flax and the weeds of flax. The paper discusses the evolution of weeds and crops and finally the interrelationships between them. Some weeds have a devastating effect on harvest yields, (*Camelina* in *Linum usitatissimum*) others have a beneficial effect. The theory of allelopathy is put forward.—D.B.

ÅSLANDER, A. Odling av ogräsfritt lin. [**Cultivation of weed-free flax.**] *Lantm. Svenskt Land.* **32.** 513-4. 1948. **300**

Weed-free flax crops are obtained by sowing on broken up leys, particularly those which have been left down for many years. The chlorate method is highly effective against all perennial weeds, particularly if chlorate is spread on the ley during the height of the summer at the rate of 200 kg. per ha. The ley should then be left untouched until well on in the autumn, when it should be ploughed to the usual depth. On suitable types of soil chlorate treatment of the flax field itself is to be recommended as the plant is markedly insusceptible to chlorate. Hormone derivatives are unsuitable for use with fibre flax. Small doses have proved fairly innocuous to oil flax, but then only the most susceptible weeds are destroyed, for example, *Sinapis arvensis*. Copper sulphate and solutions of other copper salts have frequently given good results in trials, but are costly and dependent on weather conditions. Sulphuric acid is highly effective against annual weeds and correctly used is innocuous to flax. It kills the weed plants within an hour. A suitable amount is 40 kg. concentrated sulphuric acid per ha. diluted to 1000 litres. Spraying should be carried out when the flax is 5-7 cm. high. In investigations conducted in the province of Örebro dusting with calcium cyanamide at the rate of 150 kg. per ha. gave excellent results. This treatment should not be employed on areas where *Triticum repens* has been destroyed by previous chlorate treatment.—R.P.J.

DENMARK, Statens Forsøgsvirksomhed i Plantekultur. Medd. 401. Forsøg med Ukrudtsbekæmpelse i Spindhør 1939-1944. [**Experiments in control of weeds in fibre flax crops.**] *Tidsskr. Planteavl.* **52.** 184-7. 1947. **301**

The experiments (12 in all) were conducted at the Danish State Experiment Stations at Lyngby, Aarslev, Blangsted and Ribe. The results showed that horse hoeing is an excellent means of keeping the flax fields clean, when sowing is carried out in drills 15 cm. or more apart. It is effective against all weeds. Horse hoeing should be carried out when the flax plants are 5 to 8 cm. high. Some of the weeds can also be destroyed by means of the weed harrow, but it must be used with caution as it can injure the flax, particularly on loose soil. It is effective in destroying delicate seed weed plants and germinating weed seeds. Weed harrowing should be carried out when the flax plants are 2 to 4 cm. high, and always along the drills. The effect of spraying with a 3 per cent solution of blue vitriol depends on the species of weeds present. It gives excellent results in the control of *Brassica campestris* and *Polygonum convolvulus* particularly when spraying is done before the weed plants are too big. The solution should be applied before the flax plants are 8 to 10 cm. high. Dusting with calcium cyanamide has a similar good effect against *Brassica campestris* and *Polygonum convolvulus*: it is the only one of the chemicals tested which has proved highly efficacious against *Chenopodium*. As calcium cyanamide is injurious to the flax plant, it should only be employed when *Chenopodium* occurs in large numbers and then only in an amount of 50 kg. per ha. Dusting should be carried out in calm weather while the dew is still on the crop.—R.P.J.

DELATTRE, R. Note sur *Crotalaria* plante—hôte de *Platyedra Gossypiella*. [**Notes on** *Crotalaria*, **a host plant of** *Platyedra Gossypiella*.] *Cot. Fib. trop.* **3.** 57-8. 1948. **302**

The presence of *Platyedra Gossypiella* in French West Africa has been noted for 5 years, the damage caused to cotton cultivation being particularly high in Central Ivory Coast. The infection at the I.R.C.T. station at Bouaké has resulted higher than in the crops grown by the natives, and researches with the object of explaining this difference have been directed mainly towards the host plants. It was believed that *P. Gossypiella* attacks only a limited number of Malvaceae but larvae of this insect were found on *Crotalaria mejussei*, a leguminous plant grown as a cover at the station. Other species of *Crotalaria* also grown at the Station, have not, so far, been found infected.—E.B.

FU, S. F. **Control of cotton leaf-rollers.** *Nung Pao* **7.** 478-9. 1942. **303**

The life history and the economic importance of the cotton leaf-rollers in Szechuan are discussed. Detailed survey showed that over 90 per cent of the insects hibernate over winter in the old bark of mulberry trees near the cotton field. Hand picking in winter is suggested.—H.C.Y.

ALABAMA, Agricultural Experiment Station. Leafl. No. 24. **New dusts for cotton insect control.** By *F. S. Arant* and *W. A. Ruffin.* 1948. pp. 4. **304**

Only 3 dusts proved effective in cotton insect control in Alabama in 1947. These were chlorinated camphene, 20 per cent, benzene hexachloride-DDT, 3-5 mixture and calcium arsenate alternated with calcium arsenate-nicotine. Information is given on when and how to apply these dusts, amounts needed and precautions to be taken. A commercial boll weevil spray as well as a chlordane-DDT, 3-3 mixture and chlordane are not recommended.—P.M.

STATEN, G., and COLE, Jr., J. F. **The effect of pre-planting irrigation on pathogenicity of** *Rhizoctonia solani* **in seedling cotton.** *Phytopathology* **38.** 661-4. 1948. [New Mexico Agric. Exp. Sta.]. **305**

Following a severe attack of *Rhizoctonia* on experimental cotton plots not irrigated before planting, greenhouse experiments with infected soil were laid down to test the effect of pre-planting irrigation. The results show that *Rhizoctonia* can be partially controlled by a pre-planting irrigation and allowing an incubation period of several weeks. In rainfall areas early seed bed preparation when soil moisture is present is advocated. Antagonistic or competitive organisms may be responsible for killing out the fungus.—K.J.S.

PERU, Ministerio de Agricultura, Dirección de Experimentación Agrícola. Bol. No. 36. Nuevas enfermedades del lino en el Peru. Esclerotiniosis y antracnosis del lino. [**New diseases of *Linum usitatissimum* in Peru. *Sclerotinia* disease and anthracnose.**] By *Consuelo Bazan de Segura.* 1947. pp. 37. pls. incl. col. pls. [Phytopath. Dept., La Molina Agric. Exp. Sta., Lima, Peru] **306**

Sclerotinia sclerotiorum on flax was first observed at the Agricultural Experiment Station of La Molina in 1943, and in 1947 the disease reappeared in the same field with greater intensity. A fully illustrated account of the disease and the pathogenic agent is presented. Methods of control are preventive, crop rotation with the use of non-susceptible plants, for example the Gramineae, being the most effective. Excessively moist soil and dense sowings should be avoided. The obtaining of resistant varieties might be an effective measure of control.

Seedlings and seeds of two varieties of flax (Abyssinia Cl 701 and Bombay Cl 42) under trial in the Station's Plant Breeding Department were studied for a disease identified as anthracnose caused by *Colletotrichum linicolum* Pethyb. et Laff. Different methods of seed disinfection for the control of the disease are discussed.—G.M.R.

ЧАЙЛАХЯН, М. Х. Восприимчивость к цветковым паразитам и пол растений. *Доклады Акад. Наук СССР* Том 56. *No.* 3. стр. 321-4. 1947.

ČAĬLAHJAN, M. H. [**Susceptibility to flowering parasites in relation to sex of plants.**] *Doklady Akad. Nauk SSSR* **56.** 321-4. 1947. [Timirjazev Inst. Pl. Physiol., Moscow] **307**

See also *Field Crop Abstr.* Vol. 1, Abs. 345 and 423. From tests with hemp it is concluded that infestation by *Orobanche ramosa* is not connected with sex of the plants; greater infestation of the female plants compared with the male is due to the more rapid growth and ripening of the latter which prevent attack by the parasite. In other words, infestation is connected with secondary characters of sex which, in turn, are determined by external conditions.—M.H.

RÖSSGER, W. Beschreibung eines Boniturkastens zur Bestimmung des Verholzungsgrades der Kohlrabi-Knollen nach neuer Methode. [**Description of a new method and an apparatus for evaluating the degree of lignification in the Kohl-rabi tuber.**] *Züchter* **17/18.** 25-6. 1946. [Hort. Res. and Exp. Sta., Weihenstephan] **308**

The method is based on illumination of sections of material with standard specimens for comparison on a scale of five. The method is so rapid that two people (one evaluating, the other writing), can determine the degree of lignification in sections at the rate of 100 per hour. It has been used in the above-named Institute for breeding experiments, varietal trials and manuring trials.—D.B.

EATON, F. M., and ERGLE, D. R. **Carbohydrate accumulation in the cotton plant at low moisture levels.** *Plant Physiology* **23.** 169-87. 1948. [Texas Agric. Exp. Sta., College Station] **309**

During periods of limited water supply the cotton plant wilts; growth and development are sharply curtailed, but it loses few leaves. Growth is resumed when water is again available. The object of the investigation was to find out whether cotton gains or loses carbohydrate during drought i.e. whether photosynthesis is greater than utilization or less. Literature on this subject and on methods of measuring starch are reviewed. Carbohydrate analyses are given for plants grown in different localities. The results are summarized as follows:

" In cotton leaves, drought caused an increase in hexose sugars, variable effects on sucrose, and large reductions in starch concentrations. In stems and roots, on the other hand, there were always moderate to large increases in the concentrations of hexoses, sucrose and starch. On the basis of averages of leaves, stems, and large roots the concentrations for the plant as a whole were doubled by protracted drought. Drought thus appears to depress carbohydrate utilization by the cotton plant to a greater extent than it does photosynthesis . . . In summers with enough rainfall to prevent evident or frequent wilting, irrigation increased growth substantially."—D.B.

BRENCHLEY, W. E. **The toxic action of molybdenum in relation to soils and crops.** *Ann. appl. Biol.* **35.** 139-60. 1948. [Rothamsted Exp. Sta., Harpenden] **310**

In an attempt to explain the variable response of crop plants to molybdenum, flax was grown in plots using various soils and composts and 2 levels of molybdenum (0.75 g and 1.5 g molybdate per pot). Pedigree Liral Prince seed, dressed with Nomersan was sown. Dry weights of seed and straw obtained in 1945 and 1946 are recorded. The toxic effect varied with soil type; flax did not suffer on Rothamsted farm and common soils or on top-spit loam and top-spit compost. On old cucumber soil flax was progressively damaged with increasing molybdenum concentrations and its growth was greatly impeded on a manganese deficient fen soil, the molybdenum toxicity being masked. After correction of the Mn deficiency, the toxic effect of Mo was very marked even at the lower dressing.—K.J.S.

НЕВИННЫХ, В. А. Влияние короткого дня на развитие и рост кенафа. *Доклады Акад. Наук СССР*, Том 59, *No.* 2. стр. 371-4. 1948.

NEVINNYH, V. A. **[Effect of short day on development and growth of *Hibiscus cannabinus*.]** *Doklady Akad. Nauk SSSR* **59.** 371-4. 1948. [North Caucasian Branch of All-Union Sci. Res. Inst. Fibre Crops, Krasnodar] **311**

This is a short-day plant, and shortening the day to 10 hours accelerates development and suppresses growth, as with other short-day plants. Photoperiodic reaction is utilized in selection work with kenaf, and is the best means for speeding up development. The study is concerned with the effect of short day on growth and development of plants of different ages in varieties which have different length of the vegetative period. There is indication that kenaf is most sensitive to the action of short 10-hour day in an early growth stage, that is, when 12 days old. A short-term treatment of seedlings during 10 days gives a maximal acceleration of development but without weakening growth. —M.H.

SEN GUPTA, J. C., and KUMAR SEN, N. **Investigations on the early flowering of jute** (*Corchorus olitorius* **L.**) **sown in March.** *J. Ind. bot. Soc.* **26.** 41-9. 1947. [Presidency College, Calcutta] **312**

The cause of early flowering in jute sown in March instead of mid-April to mid-June was investigated in pot experiments. The effect of early sowing was bifurcation of the stem nearly at the base, resulting in a bushy plant unsuitable for fibre. Moisture conditions and nitrogen supply did not appear to be responsible but flowering was retarded by exposure to long day conditions. The studies are being continued.—K.J.S.

DUNLAP, A. A. **2,4-D injury to cotton from airplane dusting of rice.** *Phytopathology* **38.** 638-43. 1948. [Texas Agric. Exp. Sta.] **313**

Cotton fields distant one to 20 miles from dusted rice fields suffered fairly uniform damage. Cotton is extremely sensitive to traces of 2,4-D, but in most cases the plants recovered and bore apparently normal bolls on lateral branches. The injury consisted in distorted leaves with scalloped margins and lengthened teeth persisting for several weeks, swollen stems with ruptured cortex and occasional basal gall-like swellings, malformed bolls. It was remarkable that seedlings of the following generation showed 2,4-D injury in the form of swollen hypocotyls and that this symptom appeared in about 50 per cent of seedlings from seed picked in September from bolls formed several weeks after the original damage occurred. Such seedlings resulted in delayed emergence, flowering and fruiting which is serious from the aspect of insect attack. Special precautions to be observed in aeroplane dusting with 2,4-D are outlined.—K.J.S.

RAINEY, R. C. **Observations on the development of the cotton boll, with particular reference to changes in susceptibility to pests and diseases.** *Ann. appl. Biol.* **35.** 64-83. **314**

Growth curves are given showing progressive changes in dry weight and composition of the plant (nitrogen, sugars, oil and cellulose) during flowering and boll development. Developing ovules are richest in reducing sugars during the second and third weeks. Bolls of this age are attacked by the later instars of *Heliothis* and *Diparopsis* which are the stages at which larvae fat accumulation is a maximum. *Dysdercus* spp. show marked preference for bolls at this stage. Reducing sugars also provide a very suitable source of carbon for the fungus *Nematospora*. At maturity the boll may offer suitable nutritional conditions for *Alternaria* (namely cellulose soil). Ripening seeds are the main food of *Platyedra* and may favour oviposition in *Dysdercus*.—K.J.S.

ALTSCHUL, A. M., KARON, M. L., and KYAME, Lillian. **Catalase and peroxidase in germinating cottonseed.** *Arch. Biochem.* **18.** 161-70. 1948. **315**

It was found in an investigation of the changes in concentation of catalase and peroxidase in germinating cottonseed that the amount of extractable catalase decreased and that of peroxidase increased during germination. In one experiment, the amount of extractable catalase decreased to 18 per cent of its value in resting seed whereas the extractable peroxidase increased 21-fold in the course of a 5-day period of germination.

The above mentioned changes occur in both the radicle and the hypocotyl and cotyledons of the cotton seedling.

The decrease in amount of extractable catalase during germination was observed to be much greater than the decrease in total catalase. It is suggested that one of the functions of catalase is to regulate, in conjunction with peroxidase, the amount of free energy of oxidation available for biological work.—Authors' summary.

SUGAR BEET

DECOUX, L. Cinquante ans de progrès dans la culture de la betterave sucrière en Belgique. [**Fifty years of progress in the cultivation of the sugar beet in Belgium.**] *Sucr. Belge* **66.** 2-18. 1946. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont] **316**

The following subjects were considered: the sugar beet at the end of the 19th century; development of agricultural implements; development of laws of fertilization during the 50 years; selection; the most important advances in research during this period; chemical manures for the beet; and records of production.—D.B.

MULDER, F. De teelt van suikerbieten op lichte gronden. [**Sugar beet growing in light lands.**] *Maandbl. LandbVoorlDnst* **5.** 428-31. 1948. [Chief Asst. to Agric. Adviser, Groningen] **317**

A short account of the conditions necessary in light lands and the advantages of growing sugar beet. Attention is drawn to the fodder value of the leaf.—G.M.R.

STEHLÍK, V. Zemědělský plán a kultura cukrovky a semenačky. [**The agricultural plan and the cultivation of sugar beet and mother beet.**] *Vestn. čsl. Akad. Zeměd.* **22.** 134-47. [French summary p. 147] 1948. **318**

Czechoslovakia's sugar beet production and yield during the last 3 decades is being compared with that of other countries. The advantages of the cultivation of sugar beet are discussed, but when compared with sugar cane, manual labour is more difficult (stoop-labour) and machinery for cultivation more expensive. Reference is made to the suitability of segmented (corticated) single beet seed which, together with the use of suitable machinery will speed up, simplify and save manual labour by 30-90 per cent. In Czechoslovakia most of the manual labour has to be done during harvesting and is usually coupled with unfavourable weather. The cultivation of sugar beet should aim at the production of leaf and sugar. The author is confident that under favourable conditions the average sugar beet could have 25 per cent content and weigh about 7 kg.

The 2-year plan (commenced on the 25th October, 1946,) asks the sugar industry to produce 672,000 tons of refined sugar, and 158,000 tons of molasses. Agriculture should produce 4,826,000 tons of sugar beet in 1947 and 4,719,000 tons in 1948. The harvest in 1947 has not come up to expectations and only 50 per cent of the quota has been achieved. The author remarks that this does not mean one has to fear the next year, because dry years are usually followed by fertile ones.—K.A.A.

ВЕЩЕРЕВИЧ, —. Перспективы развития сахарной промышленности в Алтайском крае и в других областях Западной Сибири. *Сахар. Промышл.* 1948. *No.* 1. стр. 8-10.

VEŠČEREVIČ, —. [**Prospects of development of the sugar industry in the Altaï territory and in other regions of Western Siberia.**] *Sahar. Promyšl.* 1948. No. 1. pp. 8-10. **319**

In the Altaï territory in the pre-revolution period there was no sugar industry. In 1931 the first Sibirsk-Alei sugar factory was erected with a daily production from 6000 centners of beet, and in 1935 the second was formed at Biĭsk with production from 12,000 centners of beet per day. Following a decline of production in the war years, there has more recently been an improvement due to the establishment of large Beet State Farms along the Novo-Sibirsk—Alma-Ata railway but this has not affected the decline of the Biĭsk factory which is located away from the production centres. Considerations of distribution should be incorporated in development schemes, and study of means to increase the areas sown to beet should be initiated. —M.H.

BRUINSMA, J. R., and STUMPEL, J. M. H. Aantallen-proefvelden 1933-1940. [**Field trials to test the optimal number of plants per unit area, 1933-1940.**] *Med. Inst. rat. Suikerprod.* No. 1. 1-21. [English and French summaries, pp. 20-1.] 1947. [Inst. rat. Suikerprod., Bergen op Zoom, Netherlands] **320**

Nine trials are concerned in this account, two on sandy soils, the remainder on clay ranging from light to heavy. The same variety of sugar beet was used, and the density of planting tested was 40,000; 62,500; 104,000; and 127,500 plants per ha. respectively, or approximately 16,000; 25,000; 41,600; and 51,000 plants per acre.

Increasing the number of plants from 62,500 to 72,500 per ha. resulted in the following increases in yield (mean for nine fields, in percentage): leaves and tops, about 7.7; roots, about 7; sugar content, about 0.3; and yield of sugar, about 7.3. This finding is of value for the sugar beet grower.

The chemical composition of the plants under the different planting rates are shown in a table for four of the nine trials.—G.M.R.

BRUINSMA, J. R. Aantallen-stikstof-rassenproefvelden 1942. [**Sugar beet trials relating to planting distance, nitrogen and varieties, 1942.**] *Med. Inst. rat. Suikerprod.* No. 2. 25-67. [English and French summaries, pp. 79-82.] 1947. [Late Inst. rat. Suikerprod., Bergen op Zoom, Netherlands] **321**

An account is given of sugar beet growing experiments conducted in four places to test respectively (1) three planting distances (833, 625, and 500 plants per are) in combination with four different quantities of nitrogenous fertilizer ranging from 80 to 200 kg. N per ha.; (2) three varieties, A, F, and G, in combination with three different planting distances as above; (3) and (4) the same three varieties in combination with six different quantities of nitrogenous fertilizer ranging from 60 to 160 kg. per ha. Results are discussed and tabulated with special reference to the yield of leaves and tops and of roots, sugar content and sugar yield, and chemical composition. They correspond with results obtained in earlier trials, and although interactions are not as yet significant, there are indications that significant interactions may be obtained when the trials are repeated.—G.M.R.

RIETBERG, H. Groenbemestingsproefvelden 1942. [**Green manurial trials in relation to sugar beet yield, 1942.**] *Med. Inst. rat. Suikerprod.* No. 3. 83-98. [English and French summaries, pp. 95-8.] 1947. [Inst. rat. Suikerprod, Bergen op Zoom, Netherlands] **322**

Two trials are described. In the first, five treatments were compared: (1) vetch, 150 kg. per ha., + 90 kg. N; (2) summer rape, 50 kg. per ha., + 90 kg. N; (3) no green manure, 90 kg. N per ha; (4) no green manure, 120 kg. N per ha; (5) farmyard manure + 90 kg. N per ha. The green manure was sown 17 Sept. 1941 and ploughed under in mid-December, the sugar beet was sown 16 Apr. 1942. The sugar beet yields of leaf, root and sugar, and the percentage sugar content, with mean error, are tabulated. The highest sugar yield was obtained from treatments (1) and (5), in which vetch appeared to increase root weight but farmyard manure to increase sugar content. The high leaf weight of (1) and (4) appeared to have a favourable effect on root weight. Analysis of the results of treatment (5) show that the field was deficient in potassium and phosphorus and that therefore green manure could not produce maximal yield.

In the second trial three treatments were compared: (1) colza as green manure, 14 kg. per ha., + 8 kg. N; (2) no green manure, 80 kg. N per ha.; (3) no green manure, 120 kg. N per ha. The green manure was sown 5 Sept. 1941 and ploughed under at the end of November; the sugar beet was sown 16 April and harvested 5 Nov. 1942. The effect of the green manure was slight, and chiefly perceptible in a higher nitrogen content of leaves and tops. The effect of N alone was also slight. The favourable ratio of root to plant weight is attributed to the late harvesting and the fact that the leaves remained green practically to the end.—G.M.R.

STUMPEL, J. M. H. Proefvelden met twee objectenreeksen 1943. [**Field trials with two series of treatments, 1943.**] *Med. Inst. rat. Suikerprod.* No. 7. 193-210. [English and French summaries, pp. 209-10.] 1948. [Inst. Rat. Suikerprod., Bergen op Zoom, Netherlands] **323**

(1) At Woensdrecht. Three sugar beet varieties, A, F and G, were sown on 30 Mar., 10 Apr., 21 Apr. and 3 May, 1943, respectively. A similar response was made by all three varieties to change in the date of sowing. Root yield and sugar content fell sharply as the date of sowing was later. Under late sowing the mean decrease in sugar yield for the three varieties was 23.2 per cent. (2) At Heense Molen. The same three varieties were tested for their response to different planting density, namely, in plants per acre, 20,200; 25,300; and 33,700. The response of varieties F and G was similar (increased weight of leaves, roots and sugar and in F slightly increased sugar content with increasing number of plants per acre), but in variety A there was a decrease in weight of leaves, roots and sugar although an increase in sugar content as the number of plants per acre increased. Variety A has a larger rooting system which is unable to develop completely under dense planting. (3) At Strijen-Sas. The effect upon the same three varieties of applying nitrogenous fertilizer ranging in quantity from 35.7 to 160.6 lb. N per acre was studied. The response was the same in all three varieties, namely, increased yield of leaves and roots with increased amounts of N but decreased content of sugar. The sugar yield remained practically constant from 53.5 lb. N per acre upwards. The chemical composition of the plants under the different applications of nitrogen is shown.—G.M.R.

STUMPEL, J. M. H., and VERBURGT, J. W. Groenbemestingsproefvelden te Kruisland en Dinteloord in 1943. [**Green manurial trials at Kruisland and Dinteloord, 1943.**] *Med. Inst. rat. Suikerprod.* No. 8. pp. 221-34. [English and French summaries, pp. 233-4.] 1948. (Inst. rat. Suikerprod., Bergen op Zoom, Netherlands] **324**

Vetch as green manure produced no significant increase in the yield of sugar beet which is attributed to the good state of fertility of both fields.—G.M.R.

RIETBERG, H. Beschouwingen over de practische suikerbietenteelt. IX. Mogelijkheden ter vermindering van het arbeidsprobleem voor de suikerbietenteelt. [**Observations on sugar beet growing. IX. Labour-saving possibilities.**] *Med. Inst. rat. Suikerprod.* No. 1. pp. 1-13. 1947. (Inst. rat. Suikerprod., Bergen op Zoom, Netherlands] **325**

There are discussed successively the use of segmented seed and the mechanization of cultivation and harvesting.

Segmented seed. Twenty experiments were made in different parts of the Netherlands sugar beet-growing region in 1946. The seed was processed by apparatus imported from Sweden and sown at the rate of 8 to 10 kg. per ha. by means of whatever seeder was in use on the farm concerned. Distribution of the seed was on the whole more uniform than in the case of normal seed. The seed came up 2 to 4 days earlier than that of non-treated material: reduction of singling ranged from 12 to 50 per cent. Increased yield was obtained in nine out of fourteen experiments. Requisites of success in the growing of segmented seed are a well-prepared seed bed (three experiments failed for lack of this), relatively shallow sowing (not exceeding 2 to 2.5 cm.), and the avoidance of easily crusted soil and of heavy seeding rates. " Pelleted " and polished seed as used in the U.S.A. is described but has not been tried in the Netherlands. An advantage of polished seed is that a higher percentage of grains contain two or more germs and the risk is therefore less than with monogerm seed. Experiments in the Netherlands are to continue.

The discussion on mechanization contains information on experiments with the John Deere, the Hilleshög Robot (from Sweden), the Catchpole and other machines. An increased use of mechanization in the Netherlands is considered desirable. —G.M.R.

GRONINGEN, Commissie ter Bevordering der Suikerbietenteelt. Rapport van de Commissie ter Bevordering der Suikerbietenteelt te Groningen. 1946. [**Report of the Committee for the Promotion of Sugar Beet Cultivation, Groningen. 1946.**] *Med. Inst. rat. Suikerprod.* No. 2. 13-63. [English and French summaries, pp. 62-3.] 1947. **326**

The report covers the following subjects. (1) Returns on sugar beet yield for 1946 in the northern provinces of the Netherlands. The acreage was not up to pre-war level. Root yield was normal, but sugar content tended on the whole to be rather low. (2) Manurial trials in three localities. The effect of different manurial treatments on the yield of roots, leaves, and sugar and on sugar content are discussed and tabulated. Labour shortage was an obstacle to the work. (3) Three trials of segmented seed. A small quantity of American material was used and also segmented seed from Hilleshög, Sweden, grown in comparison with ordinary Hilleshög. The segmented seed, which could probably absorb water more rapidly, came up 3 or 4 days earlier than the normal seed , singling was unnecessary, a 20 to 30 per cent saving of labour in thinning was effected. The use of segmented seed is considered very promising, but the seed supplied was too irregular in size for a sowing machine to be usable and more uniform material is desirable. (4) Harvesting problems. A discussion of different mechanical beet lifters and harvesters, with special reference to the John Deere and Hilleshög Robot harvesters. (5) Study tour in England (pp. 32-56). This account of the visit of a deputation to English beet-growing areas in October, 1946, makes up the greater part of the report and contains a comparison of British and Dutch problems, practice, and experimental work in sugar beet growing, harvesting and processing. (6) Vernalization experiment. A few plots were sown with vernalized seed at the end of March, 1946. Although initial development was normal, bolting took place in ± 70 per cent of the plants. These bolters were less vigorous than normal plants. The process requires further trial. (7) Experiments in wintering stecklings in the field. The object of this is to save labour, but it is not found very satisfactory and the risks are considerable. A labour-saving, mechanical method of lifting, burying and subsequently disinterring stecklings is described. (8) The requisite conditions for the successful wintering of stecklings in clamps are described. A temperature of 0.-3°C. is desirable: means of maintaining this are outlined.—G.M.R.

DECOUX, L., SIMON, M., WAUTHY, R., and ERNOULD, L. Quelques particularités de la culture de la betterave. [**Information regarding the cultivation of beet.**] *Publ. Inst. belge Amelioration de la Betterave* **16.** pp. 23. 1948. [Inst. Belge pour l'Amelioration de la Betterave, Tirlemont] **327**

The first chapters discuss the advantages of rapid and superficial cultivation of the soil followed by early seeding (a method which has given very good results); labour saving machinery; soil analysis; progress in combatting diseases and pests; and the value of sugar beet as a forage crop. In a normal year the average yield per ha. is equivalent to 600 kg. digestible protein and 3870 kg. of starch equivalents. Sugar beet produces per ha. sufficient forage to feed three milking cows for the 6 months during which the cows are stall-fed indoors.—D.B.

SCARPONI, F. Metodi di concimazione e produzione della bietola da zucchero. [**Manuring and production methods with sugar beet.**] *Soc. Gen. Montecatini, Serv. tecn. agrar.* Quad. No. 1. 1947. **328**

Results of three series of trials carried out in Emilia and Lombardy on mineral manuring of sugar beet with different systems of distribution, are reported. With the same quantity of fertilizer, the best results have been obtained by placing two-thirds of the fertilizer at 15 to 20 cm. deep in the soil before sowing, and one-third in contact with the seed. This system appears to be particularly suitable for potassium manure that so far, in the regions of the experiments, had proved ineffective. —E.B.

O'GRADY, L. J. **The effect of alfalfa and sugar beet residues on following crops.** *Rev. d'Oka* **22.** 65-81, 95-126 and 127-56. 1948. **329**

A comparative study was made of the manurial value of alfalfa at various stages of maturity, and of sugar beet green residues. Total alfalfa plant samples 1, 2 and 3 years old, fertilized and unfertilized, were collected from the field on April 17, April 27 and May 10, and were incorporated into soils for a sugar beet crop in the greenhouse. Alfalfa 4,8,9,11 and 14 months old was grown in the greenhouse. At blossom time of the first alfalfa sowed (14 months old plants), the tops were cut and discarded, and another group of plants were sowed (11 months old plants). When the last plants sowed (4 months old plants) blossomed, all plants (tops and roots) were harvested and incorporated into the "same soil" (having grown the alfalfa) and into "new soil" (identical soil, not having grown the alfalfa) for a sugar beet crop in the greenhouse.

Alfalfa 3 and 6 months old was also grown in similar manner and incorporated into the 'same soil" and into "new soil" with and without addition of 2 grm. of 2-16-8 fertilizer per jar (500 lbs. per acre) at seeding of the sugar beets. A study of sugar beet green residues used as green manure was also conducted in the greenhouse with grain crops. Nitrification studies were made on the plant material used as green manure, and soil chemical analyses were made to supplement the information secured from the various crops grown. —From author's summary.

МЕЛЬНИК, М. К. О семеноводстве многолетних трав в свеклосовхозах. *Сахар. Промышл.* 1948. *No.* 2. стр. 40-2.

Meljnik, M. K. [**Seed production of perennial herbage in beet State Farms.**] *Sahar. Promyšl.* 1948. No. 2. 40-2. **330**

To ensure a sufficient amount of herbage seed for beet State Farms where a grass/legume mixture is required for the herbage break in the rotation, from 20 to 50 per cent of the rotation area should be used for seed production. Means by which satisfactory yields may be achieved are discussed. [For full translation see *J. Brit. Grassl. Soc.* Vol. 3, No. 3, Section on Research and Problems Overseas, U.S.S.R. pp. 210-3.]—M.H.

Bruinsma, J. R. Onderzoek over de variabiliteit van het wortelgewicht van suikerbieten. [**The variability of the root weight in sugar beet.**] *Med. Inst. rat. Suikerprod.* No. 2. 68-82. [English and French summaries, pp. 79-82.] 1947. [Late Inst. rat. Suikerprod., Bergen op Zoom, Netherlands] **331**

Studies of variability in the root weight of four sugar beet varieties were made in 1941, 1942 and 1943. Table 1 shows for each variety the number of individually weighed roots, the mean root weight, the standard deviation, the standard error of the mean root weight, and finally the coefficient of variation and its standard error. Variety A has a mean coefficient of variation which is significantly greater than those of varieties F and G, while F and G exhibit no significant difference.

The "standard error of the mean of a trial" is then discussed in more detail, the data obtained allowing different standard errors of the mean, each of which is significant. This is summarized in table 2. In the last column of this table is indicated the number of roots which must be weighed in order to obtain a mean standard error of 1 per cent.—From author's summary.

Hellinga, J. J. A. Laboratoriumproeven ter bestudeering van den invloed van de bemesting op groei en minerale samenstelling van de suikerbiet. [**Laboratory experiments on the influence of fertilizers on the growth and mineral composition of sugar beet.**] *Med. Inst. rat. Suikerprod.* **15.** 103-51. [Separate, mimeographed English summary.] Bergen op Zoom, 1946. **332**

See *Soils and Fertilizers.* Vol. 10. Abs. 203. 1947.

Rietberg, H. Na - Ca - Stikstofproefvelden 1941-1942. [**Na - Ca - nitrogen field trials, 1941-1942.**] *Med. Inst. rat. Suikerprod.* No. 4. 105-48. [English and French summaries, pp. 145-8.] 1947. [Inst. rat. Suikerprod., Bergen op Zoom, Netherlands] **333**

The results of four manurial trials are discussed in relation to sugar beet yield (leaves and tops, roots, sugar), sugar content, economic value, and chemical composition.—G.M.R.

Hellinga, J. J. A. Laboratoriumproeven ter bestudering van den invloed van de bemesting op groei en minerale samenstelling van de suikerbiet. III. Bemestingsproef met dusariet in 1942. [**Pot trials to study the effect of manuring on the growth and mineral composition of sugar beet. III. Manuring experiments with dusarite in 1942.**] *Med. Inst. rat. Suikerprod.* **16.** 149-81. [English and French summaries, pp. 178-81.]. 1948. **334**

See *Soils and Fertilizers.* Vol. 11. Abs. 1305. 1948.

Stumpel, J. M. H. Stikstof-proefveld Strijen 1943. [**Nitrogenous fertilizer trial at Strijen, 1943.**] *Med. Inst. rat. Suikerprod.* No. 9. 235-56. [English and French summaries, pp. 255-6.] 1948. [Inst. rat. Suikerprod., Bergen op Zoom, Netherlands] **335**

Among the results of a trial of different quantities of nitrogenous fertilizer applied to sugar beet, it was noted that the sodium content of the root and potassium content of the leaves and tops are related to the sugar content of sugar beet, the relationship being in the first case a negative, and in the second a positive one.—G.M.R.

RAMEAU, J. T. L. B. Onderzoekingen in Nederland betreffende de betekenis van natronbemesting voor bieten. [**Research in the Netherlands on the importance of Na_2O fertilizing for beet.**] *Maandbl. LandbVoorlDnst* **5.** 73-7. 1948. [Agric. Res. Sta., Groningen, Netherlands] **336**
See *Soils and Fertilizers.*

MARTIN, M. L'arrachage mécanique des beteraves à Boistrancourt-Carnières. [**Mechanical uprooting of beet at Boistrancourt-Carnières.**] *Potasse* **22.** 5-7. 1948. **337**

At a field demonstration held at Boistrancourt machinery for uprooting and loading, unloading and transport of beet and for sowing segmented seed were on view. There was also a demonstration of implements used in beet cultivation. The small-scale cultivator uses the sugar beet plant for fodder as well as for sugar. For him there are machines for topping the beet.—D.B.

UTAH-IDAHO SUGAR COMPANY. **Machine harvesting marches on: A report of 1947 results and 1948 prospects.** 1948. pp. 65. **338**

Records and appraisals of a number of different makes of sugar beet harvesters, are presented. Short articles by various authors, give facts and figures concerning the different types of sugar beet harvesting machinery at present in use in the U.S.A.—P.M.

MILLER, P. T., and SAVAGE, J. W. **By-products from sugar beets.** *Sug. J.* **11.** 5-6 and 13-8. 1948. [Nat. Resources Inst. Univ. of Wyoming] **339**

In 1945 the Sugar Research Foundation made funds avilable to the Wyoming National Resources Research Institute to assist in work on the by-products of the sugar beet industry. One of the main studies has been that of pectin production from the spent beet pulp which contains approximately 20 per cent of the dry weight as potential pectin. Much of this pectin can be extracted by mild acid diffusion and a process is described by which the extraction is carried out. Methods of purification of the raw product are outlined, as well as some of the properties and uses of the pectin obtained.—P.M.

EDINBURGH AND EAST OF SCOTLAND, College of Agriculture, Economics Department Fmrs' Leaf. No. 6. **1947 Crop costs studies. 1. Sugar beet.** By *W. D. Duthie* and *H. C. McIver.* 1948. pp. 20. **340**

The fifteen crops under review were grown on loam soils, and all except three followed cereals. All received varying amounts of compound fertilizers. The crop receiving the smallest amount of fertilizers yielded the lowest amount of beet. The 1947 results are compared with those for 1945 and 1946, and whereas costs per acre for clean beet and tops were highest in 1947, costs per ton were lower in 1947 than 1946. The sugar content was 17.1 per cent in 1947 compared with 15.6 per cent and 15.7 per cent in 1945 and 1946 respectively. The influence of yield on costs and returns is clearly indicated by the results. In 1946 when the yield was just over 7 tons per acre, a loss of £2 15s. 3d. per acre was sustained. This yield was almost a ton less than in 1947 and over two tons less than in 1945. But all the factors involved in sugar beet producion are not within the farmers' control. Assuming a return of 15s. 0d. per acre for beet tops, yields of more than 7 tons per acre may be expected to produce a profit always provided the greatest efficiency is maintained particularly with regard to cultivations and manuring.—T.G.J.

DUDIK, G. F. **Sugar developments pose question: scarcity or surplus?** *Foriegn Comm. Wkly* **31.** 3-5, 11 and 48. 1948. **341**

During the war, when military operations devastated producing areas and reduced world sugar output, a seemingly insatiable demand existed for sugar. But to-day in some areas there is an actual or anticipated surplus. World cane and sugar-beet crops of 1948 are expected to yield a sucrose (cane or beet sugar) output of approximately pre-war proportions. The increase in world population may offset this restored output, but the limiting factor seems likely to remain the financial straits of some nations. Before the war, when the problem was largely one of overproduction, it was the accepted policy to regulate exports in accordance with import requirement and thus secure a fair return to efficient growers and producers. The war brought devastation to the beet fields of western Europe and the Ukraine, and the cane industry of the Phillipines, Java and Formosa; Cuba, on the other hand, has increased its cane production by nearly 200 per cent between 1941 and 1947. The U.S.A., United Kingdom and Canada were the main purchasers, but other countries had reduced their claims. The U.S. Department of Agriculture, under the Sugar Act 1948 which is operative for 5 years, estimated sugar needs for 1948 at 7,500,000 tons; 1,800,000 tons of this figure are to be supplied from domestic beet. The war has led to changes in the geographic distribution of sugar production, with significant effects on world trade and consumption patterns. European sugar producers, exporting about 500,000 tons per annum before the war, are expected to ship not more than 300,000 tons in 1948. To complicate this position, those countries of western Europe whose indigenous production of sugar has decreased most, are also those which have the greatest exchange difficulties impeding sugar imports. The future position is likely to be that of increasing national self sufficiency which would convert the present dislocation into a true surplus, unless international controls on supplies again become operative.—T.G.J.

GASSLANDER, C. H. Odling av sockerbetsfrö. [**Production of sugar beet seed.**] *Svensk Frötidn.* **13.** 83-5. 1944 [Received 1948] **342**

The seed used in sugar beet cultivation in Sweden has for many years been produced in the country itself. In 1906 the Svenska Sockerfabriks AB set up an orgization at Säbyholm, near Landskrona, where breeding and seed production of this crop were conducted. Material was obtained from a number of foreign breeders, and intensive work was carried on in order to find a sugar beet suitable for Swedish conditions. In 1912 the institution was transferred to Hilleshög, north of Landskrona, where it is still located. In 1920 a seed production institute was established in Landskrona. It is responsible for all matters relating to seed production, such as contracting, drying and cleaning, distribution, etc.

In 1913 the seed harvest amounted to 275,000 kg: in 1920 it was approximately 900,000 kg. which corresponded to the requirement at that time. After 1921 seed production declined somewhat, but as in 1940 the import of German seed ceased, indigenous seed was again produced on a sufficiently large scale to satisfy the major part of the country's requirements.

Directions are given for sowing of the seed, planting of stecklings, management of plots, harvesting, etc. The average yield for the 10 years up to 1943 was 2,500 kg. per ha., but yields of 4,000 kg. and over are not unusual.—R.P.J.

ÖHMAN, E. Om användningen av enkornigt betfrö. [**The utilization of mono-germ beet seed.**] *Tidskr. Lantm.* **30.** 121-2. 1948. **343**

In many instances 23-30 per cent saving of labour is effected by sowing mono-germ beet seed. Such seed was tested in Sweden in 1947 on an area of approximately 3200 ha. This year the area is to be increased to 5400 ha. Germination of mono-germ seed is slower than of ordinary seed. According to a report in "Dansk Lantbrug" a Danish farmer obtained favourable results by soaking the seeds until the sprouts were visible. In 3.5 days the plants had broken through the soil crust; plants from ordinary seed sown at the same time took 8 days to do so.—R.P.J.

HELLINGA, J. J. A. De vermeerdering van bietenaaltjes door de teelt van kruisbloemige gewassen. [**The spreading of the beet eelworm** (*Heterodera Schachtii*) **through the growing of cruciferous crops.**] *Med. Inst. rat. Suikerprod.* No. 3. 69-85. [English summary] 7 pls. 1946. [Late Inst. rat. Suikerprod., Bergen op Zoom, Netherlands] **344**

The beet eelworm propagates on the roots of cruciferous crops, especially on a winter crop of colza, upon which under normal climatic conditions an autumn as well as a spring generation can develop. The extension of colza fields is consequently a serious threat to sugar beet growing, which is only possible on "beet-weary" soil by means of an ample rotation.—Author's summary.

HELLINGA, J. J. A Veldjesproef op aaltjeszieken grond in den proeftuin (1940-1942). [**Trial plots on eelworm-infested soil (1940-42).**] *Med. Inst. rat. Suikerprod.* No. 3. 86-95. [English summary.] 1946. [Late Inst. rat. Suikerprod., Bergen op Zoom, Netherlands] **345**

Fifteen 11 × 2 m. plots in eelworm-infested soil were divided into 5 groups receiving different crop rotations in 1940 and 1941. In 1942 sugar beet was grown in all of them. The five rotations were: (1) turnips (trap crop)/carrots/sugar beet; (2) flax/onions/sugar beet; (3) lucerne/flax/sugar beet; (4) yellow mustard/kidney beans/sugar beet; (5) potatoes/broad beans/sugar beet. The trap crop was destroyed four times in 1940. The yield of leaves and root weight (expressed in kg. per are), the percentage sugar and the weight of sugar obtained (expressed in kg. per are) exceeded in the first treatment the corresponding values for all other treatments. It is remarkable, however, that these yield figures cannot be explained on the basis of the number of cysts and larvae per cyst found in the soil. Probably the rather cold and dry spring of 1942 was unfavourable to the development of eelworms, so that the difference in yield must be explained as reflecting a difference in soil fertility.—Author's summary.

HELLINGA, J. J. A. Proeven ter bestrijding van bietenaaltjes in 1942 (in bakken). [**Experiments in the control of eelworms, 1942.**] *Med. Inst. rat. Suikerprod.* No. 3. 96-9. [English summary] 1946. [Received 1948] **346**

Eight boxes were treated as follows: two watered each with 5 litres tap water; two watered each with 5 litres Aretan in 0.02 per cent solution; two watered each with 5 litres colza root secretion (water in which 35 grm. of colza seed had germinated); two treated each with 20 grm. of Cystogon W 6127 D. The results of the experiments were not conclusive.—Author's summary.

HELLINGA, J. J. A. Proeven ter bestrijding van bietanaaltjes in 1943 (in bakken). [**Experiments in the control of eelworms, 1943.**] *Med. Inst. rat. Suikerprod.* No. 3. 100-2. [English summary] 1946. [Late Inst. rat. Suikerprod., Bergen op Zoom, Netherlands] **347**

Cystogon W 6127 D and calcium cyanamide

were applied to eelworms in boxes. Cystogon inhibits the development of eelworms on beet but does not entirely prevent their reproduction when applied in a dose of 100 grm. per sq. m. Calcium cyanamide, even when applied in large quantities, had only a slight effect which was chiefly attributable to the nitrogen as fertilizer.—G.M.R.

COUTURIER, A., and SOULIE, H. Observations preliminaires sur la teigne de la betterave (*Phthorimaea ocellatella* Boyd.) [**Preliminary observations on the beet moth.**] *C. R. Acad. Agric. France* **34.** 612-7. 1948. **348**

PANELLA, A. Sul consumo idrico della barbabietola da zucchero nei diversi stadi di sviluppo. [**On water consumption of sugar beet in the different stages of development.**] *Industr. saccar. ital.* **41.** 8. 1948. **349**

Trials have been carried out at the Experiment Station of Agricultural Chemistry of Rome with the object of determining water consumption of sugar beet in the climatical conditions of the country around Rome and the optimum of humidity in the soil, in regard to sugar production, at the different stages of development. Comparison of plants grown on soil kept saturated with moisture with plants grown on soil in which moisture content was kept at only 60 per cent saturation shows that, under the conditions of the experiment, complete saturation is not favourable to maximum production of sugar. In fact, when the beets were harvested, it was found that where the soil was kept saturated with moisture they contained 11.4 per cent sugar and produced at the rate of 14.2 tons dry matter and 6.0 tons of sugar per ha. Where the saturation was only 60 per cent, the beets contained 13.6 per cent sugar and produced dry substance and sugar at the rate of 14.1 tons and 6.5 tons sugar, respectively.—E.B.

ARNON, D. I. **Localization of polyphenoloxidase in the chloroplasts of** *Beta vulgaris*. *Nature Lond.* **162.** 341-2. 1948. [Molteno Inst., Univ. Cambridge] **350**

While studying oxygen evolution by isolated chloroplasts, it was considered important to explore their enzymatic composition. This communication gives evidence that a copper enzyme, polyphenoloxidase, (known as tyrosinase or catecholase) is localized in the chloroplasts of *B. vulgaris*. A full account of the experiments is to be published elsewhere.—M.H.

ROOT CROPS

LAGOS, U., J. A. Industrias agrícolas y regionales. La Yuca y el almidón. [**Agricultural and regional industries. Cassava** (*Manihot utilissima*) **and starch.**] *Rev. Agric. Costa Rica* **20.** 26. 1948. **351**

Manihot utilissima is grown in Costa Rica in the central, upland plateau, in the Esparta region of the Pacific coast, and at Turrialba and other places on the Atlantic coast. The method of extracting starch is described.—G.M.R.

COLOMBIA, Ministerio de la Economía Nacional. Agric. Ganad. No. 14. El cultivo de la yuca. [**The cultivation of** *Manihot utilissima*.] By *C. Castro*. **n.d.** [Received 1948] pp. 22. [Est. Agríc. Exp., Armero, Tolima, Colombia] **352**

Manihot utilissima (cassava) is a common article of food in Colombia and is grown in all the warm parts of the country, generally in the lowlands but also up to an altitude of 1800 m., both in relatively dry and also in the more humid regions, for it can tolerate an annual rainfall of as much as 8 m. provided the soil is permeable. The varieties grown in Colombia are listed with a note of their geographical distribution, and advice is given on progation (by means of cuttings); planting distance (space between rows ranges, according to soil type, from 1 to 1.30 m. and space between plants from 80 cm. to 1 m.); time of planting (generally towards the end of summer, so that root formation coincides with the beginning of the rainy season); method of planting cuttings, whether horizontal or at an angle of 45°; weeding and cultivation; manurial treatment (green manure and potassium); diseases and pests; and harvesting technique. The author then discusses the questions of yield, which in Colombia ranges from 12,000 to 18,000 and occasionally even 20,000 kg. per ha., industrial uses, and cost of production. In Colombia, in contrast to Brazil, the milling of *Manihot* is practically unknown, and starch fabrication is of a primitive nature. The industrialization af this crop is considered desirable.—G.M.R.

RAYNS, F. **Protein from the root crops.** *Fmg* **2.** 262-5. 1948. **353**

This is a consideration of those root crops which yield good supplies of protein, namely kales, cabbages and sugar beet tops. Kales have a number of advantages over other roots for stock feed, except in those districts where killing winter frosts are usual. They remain green through the winter and " provide the highest yield and cheapest source of protein and starch equivalent of any root crop; no other root crop is more economical to feed, provided that it is fed on the land." From the stock feeding point of view there are two types of cabbages, the Drumhead and the Openleaved, the former contains about 1.5 per cent crude protein, the latter 2.5 per cent. Respecting sugar beet it is estimated that a 10-ton crop of beet, leaves behind beet tops yielding sufficient protein to maintain one heavy-yielding cow during the winter and produce all her milk, and supplying rather more starch equivalent and protein than 10 tons of swedes or mangolds.—G.M.H.

NORMANHA, E. S., and PEREIRA, A. S. Melhores épocas de plantio para mandioca. [**The best times for planting** *Manihot utilissima.*] *Rev. Agric., Piracicaba* **23.** 237-48. 1948. **354**

The customary method of growing cassava in the Brazilian State of São Paulo is to plant in October, at the beginning of the rainy season, and to harvest either after one growing season of 8 to 10 months (general when the crop is for domestic use) or in the second year after 18 to 22 months or two growing seasons (general when the crop is to be processed for commercial purposes). The date of harvesting may range from April to August and even September, but starch and bulk yield have been found best with June-July harvesting.

In 1946-47, experiments in four different parts of the State tested (a) sowing on the 15th of each month from May to October inclusive, and (b) harvesting in the following year on the 15th of April, June and August respectively. There were 720 plants per treatment per locality. The variety most commonly grown in São Paulo, namely Vassourinha, was used and planting was by the normal regional method, mature stems about 6 in. long being placed horizontally at the bottom of furrows 4 in. deep and completely covered with earth. Mean temperature: a few degrees below 20°C. from May to August, rising a little higher in September and October. Rainfall: moderate in May, good in June to July, absent in August, good in September and October.

The results of the experiments, described and tabulated for each locality separately and for all together, show that the root yield, in tons per hectare, follows in order of merit the time of planting from May to October, the May to June plantings giving the highest yields, namely, an average of double that of the October plantings. The date of planting made little difference to the percentage shooting or density of stand. The time of harvesting was of influence in so far that root yield rose from April to June in every case; but in August, compared with June, root yield was either higher, lower or equivalent according to locality.

In general conclusions and advice for the grower, the use of 8 in. stems for planting is recommended; for the State of São Paulo, May to August is regarded as the optimal planting season and June and July as the ideal harvest months. Earlier planting may make tillage more onerous, the ground being harder, drier, and stubble-covered, but the use of tractors and disk harrows can meet the difficulty.—G.M.R.

UNITED STATES Department of Agriculture. Misc. Publ. No. 643. **Distinguishing the species of Brassica by their seed.** By *A. F. Musil.* 1948. pp. 35. **355**

The species fall into three groups (a) rapes, (b) coles or cabbage and (c) mustards. Based on configuration of seed surface, size, shape and colour, the species again fall into 3 groups coincident with (a), (b) and (c) and there is shown to be a close correlation between seed character and chromosome complement (chromosome N for rapes 19, for cabbages 9 and for mustards 10 and 18). The habit of growth and the structural features of the seeds of common brassicas are described and illustrated. Nomenclature is also discussed (60 lit refs.).—K.J.S.

HANSON, A. A., COULSON, J. G., and RAYMOND, L. C. **Further studies on brown heart in swedes.** *Sci. Agric.* **28.** 229-43. 1948. [Macdonald Coll. Quebec] **356**

Results of 13 years' studies on brown heart show that August and September are critical months, the disorder being positively correlated with rainfall and negatively with hours of sunshine during the 2 months. Brown heart develops rapidly in mid-August. The varieties Corning and Ditmar's bronze top are fairly resistant. Borax applications to soil at 25 to 50 lb. per acre broadcast and in bands, all gave significant degrees of control but were less effective than foliage sprays (8 and 16 lb. rates applied during the growing season, particularly at the stage when roots are 1-1.5 in. long). In greenhouse sand cultures potash dressings accentuated boron deficiency but field dressings had no significant effect.—K.J.S.

JARY, S. G., and CARPENTER, K. **Insect pests of Brassica seed crops in Romney Marsh, Kent.** *Ann. appl. Biol.* **35.** 134-6. 1948. **357**

Flowering in swede stecklings begins in mid-May. Pods mature towards late July. Adult *Meligethes aeneus* destroy 50 per cent of the flower buds. Eggs are laid in some buds, where larvae feed on pollen. Pupation takes place in soil. *Cevthorrhynchus assimilis* (weevil) causes some injury to buds, but they chiefly puncture young green pods, and larvae feed on unripe seeds. *Dasyneura brassicae* oviposits in pods; pods open and shed seed prematurely; up to 25 per cent pods may be affected. *D. brassicae* seems to depend on *C. assimilis* for the necessary puncture.

Field and laboratory tests show that 1 per cent rotenone dust DDT and B.H.C. are lethal to *M. aeneus* but not to *C. assimilis.* A second dusting is impracticable when the interlaced foliage prevents passage of the machine. The recommendation is to dust during the second week of May against *M. aeneus*, and to apply a pyrethrum dust 10-14 days later to control *C. assimilis* and any late *M. aeneus* beetles. Yield of seed is greatly influenced by fertility or varietal conditions as well as by pest attack.—K.J.S.

Rader, W. E. *Rhizoctonia carotae* **N.Sp. and** *Gliocladium aureum* **N.Sp., two new root pathogens of carrots in cold storage.** *Phytopathology* **38.** 440-52. 1948. **358**

Crater rot (*Rhizoctonia carotae*), described for the first time is found in carrots grown on organic and mineral soils. The organism flourishes at temperatures below those of cold storage; the damage is not apparent for 2-3 months but the root is then destroyed in 2-3 weeks. The fungus requires external nutrients before invasion; it is a soil inhabitant and grows along slats of the containers and these are probable sources of infection. The only control measures recommended are to store carrots in clean or disinfected crates kept at 0°C and at relative humidity of 90-95 per cent of saturation. Washing or dipping roots in fungicdes proved ineffective. *G. aureum* does not cause serious damage.—K.J.S.

ПЕРЕДЕЛЬСКАЯ, Н. М. Зависимость митогенетического режима растения от видимого света. *Доклады Акад. Наук СССР* Том 58. *No.* 5. стр. 915-8. 1947.

Peredeljskaja, N. M. [**Dependence of the mitogenetic regime of plants on the visible part of the spectrum.**] *Doklady Akad. Nauk SSSR* **58.** 915-8. 1947. [Inst. Expt. Biol., Acad. Med. Sci., USSR] **359**

In this study, made with table beets, the ability of plants to transform the energy absorbed from the visible part of the spectrum into mitogenetic photons of double the energy has been demonstrated.—M.H.

Somers, G. F., Kelly, W. C., and Hamner, K. C. **Changes in ascorbic acid content of turnip-leaf discs as influenced by light, temperature, and carbon dioxide concentration.** *Arch. Biochem.* **18.** 59-67. 1948. **360**

Discs cut from leaves of turnips and other plants have been used to study the influence of various factors upon the rate of change in ascorbic acid content of leaf tissues. These discs are floated on a mineral nutrient solution and exposed to various environmental conditions before being analysed. The rate of decrease in ascorbic acid content of turnip leaf discs floated in the dark was measured and found to have the temperature coefficient characteristic of ordinary thermal reactions over the range from 10°C. to 30°C.

The influence of the same temperatures upon the rate of ascorbic acid accumulation in turnip leaf discs in light of about 1400 foot candles was also measured. At the lower temperatures, the temperature coefficient is greater than at higher temperatures.

Carbon dioxide is necessary for ascorbic acid accumulation in illuminated leaf discs. The accumulation of ascorbic acid in turnip leaf discs requires light, and over the intensities used, the rate of accumulation increases as the light intensity is increased. The results obtained with leaf discs from other plants also indicate that light influences the changes in ascorbic acid content.—Authors' summary.

CROP PHYSIOLOGY

Burström, H. **Mineral nutrition of plants.** *Ann. Rev. Biochem.* **17.** 579-600. 1948. [Bot. Lab., Univ. Lund, Sweden] **361**

Lucas, R. E., and Scarseth, G. D. **Potassium, calcium, and magnesium balance and reciprocal relationship in plants.** *J. Amer. Soc. Agron.* **39.** 887-96. 1947. **362**

An analysis of published data with practical deductions. General recommendations are to lime soil so that about 75 per cent of the exchange capacity is saturated with bases (soil pH 6.0 to 6.5). Magnesium deficiency is likely in soils low in exchange capacity receiving limestone or large potash dressings. On acid sandy soil required for potatoes Mg should be added in a neutral salt. Soils with high Ca and Mg contents need large dressings of potash to build up a sufficient potential to counteract the Ca and Mg. Organic (muck) soils need large initial dressings of potash.—K.J.S.

De Turk, E. E. **Learn hunger signs of crops.** [Reprint from] *Better Crops with Plant Food* [1946] pp. 11. **363**

" A well balanced soil, as to plant feeding, is one that will deliver the different " plant food " materials into the crop in the right proportions." When there is an improper nutritional balance, plants will exhibit certain signs of deficiency of certain elements. These signs are briefly discussed with reference to deficiencies of phosphorus, potassium, nitrogen, calcium, manganese, iron, boron, copper, zinc, iodine and cobalt.—P.M.

Schuffelen, A. C. **Growth substance and ion absorption.** *Pl. Soil* **1.** 121-6. 1948. [Lab. Agric. Chemistry, Agric. Coll. Wageningen, Netherlands] **364**

The results of some experiments (with the excised roots of oat plants) concerning the influence of growth substance on ion intake by plants are presented. It has been found that the rate of ion intake is independent of low concentrations of growth substance. It is suggested that the intake takes place via the living processes. The regulation of the transport of glucose is mentioned as a possible direct function of the growth substance.—Author's summary.

МАКСИМОВ, Н. А., и КЛЕШНИН, А. Ф. Люминесцентные лампы как источник радиации для светокультуры растений. *Доклады Акад. Наук СССР*, Том 57. *No.* 2. стр. 201-4. 1947.

MAKSIMOV, N. A. and KLEŠNIN, A. F. [**Luminescent lamps as a source of radiation for plants grown under different conditions of light.**] *Doklady Akad. Nauk SSSR* **57.** 201-4. 1947. [Timirjazev Inst. Pl. Physiol., Acad. Sci., Moscow] **365**

Although plants have been studied under artificial light for more than 85 years, the utilization of this form of culture has not been practicable in raising crops, partly because of the great cost of producing light of high intensity and the absence of a suitable means for obtaining specific rays of the spectrum. The authors studied this problem during the winter months of 1947 with fifteen species of plants and an apparatus of special construction, including a luminescent lamp, by which the effect of light of different wavelength on plant growth was observed.—M.H.

WASSINK, E. C. **Photosynthesis.** *Ann, Rev. Biochem.* **17.** 559-78. 1948. [Lab. Plantphysiol. Res. Wageningen, Netherlands] **366**

ОВЧИННИКОВ, Н. Н. О влиянии фотосинтеза на поглощение листьями световой энергии. *Доклады Акад. Наук СССР*, Том 59. *No.* 6. стр. 1191-3. 1948.

OVČINNIKOV, N. N. [**The influence of photosynthesis on absorption by leaves of light energy.**] *Doklady Akad. Nauk SSSR* **59.** 1191-3. 1948. **367**

Contrary to earlier studies on this subject when conflicting data were obtained, the author's tests have given uniform results and indicate that the amount of light energy absorbed by leaves does not vary with intensity of photosynthesis. The amount of light energy absorbed by green leaves cannot, therefore, be used for measuring photosynthetic intensity.—M.H.

ДРАБКИН, Б. С. О каталазном действии отдельных тканей листа автотрофного растения. *Доклады Акад. Наук СССР*, Том 56. *No.* 3. стр. 317-9. 1947.

DRABKIN, B. S. [**The catalase action of the separate tissues of the leaf of an autototrophic plant.**] *Doklady Akad. Nauk SSSR* **56.** 317-9. 1947. [Čkalov State Med. Inst., Čkalov] **368**

It has been postulated by many authors that processes which take place during the chemical or Blackman phase of photosynthesis are effected by the help of ferments of the catalase type. Much interest is therefore attached to the experiments demonstrating the localization of catalase in leaf tissues, and the present work was started in 1940 at the Kiev State University to study, with species of *Peperomia*, the action of catalase in leaf tissues, as organs of photosynthesis. The tissues analysed were the upper epidermis and hypodermis, palisade and spongy parenchyma. There is indication that the catalase activity is quite different in the various layers. The greatest activity is manifest in the palisade parenchyma ; in the spongy parenchyma it is much lower, and is least in the epidermis and hypodermis. Associated with the greater photosynthetic activity of the palisade parenchyma, where there are the greatest number of chloroplasts, is the higher catalase activity of this tissue. There is no indication, however, of any functional connexion between catalase and photosynthesis because along with the difference in photosynthetic activity, the individual tissues are distinguished by other physiological attributies.—M.H.

БУГАЕВСКИЙ, М. Ф. Замерзание паренхимных тканей растений. *Доклады Акад. Наук СССР*, Том. 58. *No.* 6, стр. 1195-6. 1947.

BUGAEVSKIĬ, M. F. [**Freezing of plant parenchymatous tissues.**] *Doklady Akad. Nauk SSSR* **58.** 1195-6. 1947. **369**

Knowledge on the destruction of plants by low temperature is only slight and there is need for practical tests of the many theories which have been put forward. The author's preliminary work on freezing of epidermal tissues of many plants (*Allium cepa, Brassica oleracea*, winter wheat, etc.) has demonstrated that protoplasm remains alive if ice does not form in the cells. Following extreme freezing of the cells, when almost all the cell cavity is filled with ice crystals and between the crystals are layers of protoplasm, subsequent slow thawing reveals clots of protoplasm hanging from the cell walls. Such tissue is killed and does not revive.

In order to study the process of freezing in parenchymatous cells, sections were specially prepared of this tissue from tillering nodes of winter wheat, cabbage, carrots, etc., and studied under the microscope during freezing. Under temperatures of -10° to -16°C. in some cells there was instantaneous formation of small ice crystals in the epidermal cells, and, at the same time, on the surface of the sections was formed a granular crystallized film of ice, observed on both the cells with ice in the centre and in surrounding cells without ice. On other parts of the tissue in the field of vision of the microscope there was instantaneous occurrence of the ice film without noticeable ice formation within cells of the section. A similar appearance of the ice film with freezing of the epidermal cells was not observed. The congealing of the ice film involved more and more of the section surface until finally it covered almost all the cells and prevented further observation.

It is postulated that water on the surface of the section exudes from the cells, because when the water content of the cell sap and protoplasts expands by freezing, it creates pressure which is transferred to the surrounding cells thus cooled. The greater the number of cells which undergo ice formation, the greater the pressure, and water is expressed through cell walls on to the plane of the section and freezes. It is concluded from the above that up to the formation of ice in the parenchyma the film of ice does not occur, and all the cells remain alive and exhibit plasmolysis and deplasmolysis. Where there is only local formation of the film there are individual cells with damaged protoplasts, but with extreme freezing in almost all the cells the protoplasts are damaged and torn.

An interesting feature was observed with thawing. Above and below the sections there remained a layer of water, expressed from the cells during freezing, which was not reabsorbed into the cells. Apart from the water there were air bubbles above and below the sections.—M.H.

LONDON, British Intelligence Objectives Sub-Committee Overall Rep. No. 6. **Some agricultural aspects in Germany during the period 1939-1945.** 1948. pp. 12. **370**

This overall report deals with among other items the effect of light on the light sensitive seeds of *Arabidopsis thaliana*, and on the inheritance of the blossoming age in the same species (see F.I.A.T. Final Reports 1094 and 1090 respectively).—R.O.W.

ЖДАНОВА, Л. П. Фотопериодическая реакция короткодневных и длиннодневных растений в связи с их возрастом. *Додлады Акад. Наук СССР*, Том 58. *No.* 3, стр. 485-8. 1947.

ŽDANOVA, L. P. [**Photoperiodic reaction of short and long-day plants in relation to their age.**] *Doklady Akad. Nauk SSSR* **58.** 485-8. 1947. [Timirjazev Inst. Pl. Physiol., Acad. Sci., Moscow] **371**

Changes in plants due to age, on which the physico-chemical conversions of the plasma colloids are based, have a great influence on all plant activities, among which are the generative processes and their dependence on daylength. The present study is concerned with the effect of plant age on reception of photoperiodic influence with short-day plants (*Perilla nankinensis*, *Cosmos bipinnatus*) and the long-day species *Rudbeckia bicolor* and *Anethum graveolens*.

It is concluded that short and long-day plants up to a definite critical age react to photoperiodic influence less than they do at a later stage of growth. This period of weaker photoperiodic reaction is shorter in plants characterized with a high photoperiodic sensitivity (*Cosmos, Anethum*), and longer in plants less sensitive to photoperiod (*Perilla, Rudbeckia*). The relation of plant age to photoperiodic action is complicated and is conditioned by measure of leaf surface and directly with age changes. In some plants (*Cosmos*) photoperiodic sensitivity has not only a lower but also an upper age limit.—M.H.

ПОТАПЕНКО, А. О происхождении фотопериодической реакции и случаях ее приспособительного значения. *Доклады Акад. Наук СССР*, Том 57. *No.* 9, стр. 959-61. 1947.

POTAPENKO, A. [**The origin of the photoperiodic reaction and conditions of its significance in regard to adaptation.**] *Doklady Akad. Nauk SSSR* **57.** 959-61. 1947. **372**

It is well known that in short-day plants darkness leaves a protracted after-effect received in the night phase; and in long-day plants, on the contrary, light leaves a protracted after-effect. In order to study more precisely this photoperiodic after-effect, the author tested the short-day plant *Bidens tripartitus*. In the experiments there were five groups with twenty plants in each. The first (control) group received 9 hours photoperiod each day; the second, a 9-hour photoperiod alternating with one of 17 hours (natural long day); the third—9 hours alternating with two 17 hours periods; the fourth—the same with three 17 hour periods; and the fifth (also control) received natural long day throughout. In all cases the day for the plants started at 4.0 o'clock. The action of short day started on 10 May, 1946, when the plants had two leaves, and ended on 5 June. The following results were obtained:

Expt. No.	No. of short days received	Date of flowering	No. of days from beginning of expt. to flowering of 25% of plants.
1	27	8-9 June	30
2	14	10 ,,	32
3	9	21 ,,	43
4	7	22 ,,	44
5	—	21 August	104

Short photoperiod followed by long night results in such strong after-effect that the contrary influence of long day, alternating with short, is almost wholly suppressed. But two successive long days essentially counteracted one short-day (3rd group). Apparently in *B. tripartitus* one short day leaves an after-effect in a weaker form in the whole life of the plant. Thus, part of the plants in the fifth group received one short photoperiod from 4 a.m. to 1 p.m. on 17 June, and a long night from 1 p.m. on 17 June to 4 a.m. on

18 June. Flowering was induced on 26 July, but in the controls on 21 August.

The significance of these facts are discussed in some detail with regard to other environmental conditions, and with special reference to *Amaranthus retroflexus* and *Chenopodium album*.—M.H.

ROBERTS, R. H. **Blossoming and pigment content.** *Plant Physiology*. **23.** 379-87. 1948. [Univ. Wisconsin, Madison, 6] **373**

Experiments were conducted on eighteen species, in long- and short-day conditions and at temperatures described as continuously warm (75°F. minimum), warm-cool (75°F. for 13 hours at night and 55°F. for 11 hours in the day, lag not counted); cool-warm (55°F. at night and 75°F. in the day) and continuously cool (55°F. minimum). The pigments examined were carotene, chlorophyll, xanthophyll and violaxanthin. The rapid chromatographic method was used for measuring the pigments.

The following results were obtained. Different species have characteristically different amounts of the different pigments. The pigment content is affected by photoperiod and temperature. The pigment content, particularly for carotene and generally for chlorophyll, has a marked diurnal cycle; this raises the question of when to sample for these pigments. None of the pigment fractions showed a consistent association with flowering but a positive correlation between carotene and flowering might be indicated if sampling were confined to the day time and only one species was sampled. The existence of more irregular diurnal graphs of carotene for flowering plants than for non-flowering plants is comparable to the irregular carbon dioxide exchange and irregular growth rate reported for blossoming plants by earlier workers.—D.B.

STRUCKMEYER, B. Esther, and MACVICAR, R. **Further investigations on the relation of photoperiod to the boron requirement of plants.** *Bot. Gaz.* **109.** 237-48. 1948. [Univ. Wisconsin, Madison] **374**

It is known that plants maintained in the vegetative state by adjusting photoperiod to this end show morphological and anatomical abnormalities when subject to boron-deficient conditions, but under photoperiod which induces flowering, growth is normal.

The relationship between photoperiod, flowering, boron deficiency and anatomical and morphological abnormality have been further investigated in *Xanthium echinatum*, *Helianthus annuus*, *Lycopersicum esculentum* and *Glycine max* vars. Bioloxi and Pagoda. Results indicate that abnormal cambial activity is a characteristic of boron deficiency and is present whether external sympoms of boron deficiency are there or not. "It is uggested that the decrease in cambial activity associated with early floral induction or photoperiodic induction causes a reduction in the severity of boron deficiency symptoms."—D.B.

ЩЕГЛОВА, О. А. и ЕРМОЛАЕВА, Е. Я. Достижения советской науки в области фотопериодизма. *Природа, Москва*, 1948. *No.* 7. стр. 30-4.

ŠČEGLOVA, O. A., and ERMOLAEVA, E. Ja. [**Achievements of Soviet science in regard to photoperiodism.**] *Priroda, Moskva* 1948. No. 7. 30-4. **375**

The first experimental study of this subject was made in the Soviet Union during 1922. Since then the number of published works has risen to 120 in 1940. A brief review of the work of Ljubimenko and of studies made on the relationship between photoperiodism and geographical origin of plants is given. This is followed by a summary of studies on (1) reaction of plants to daylength, (2) photoperiodism in relation to physiological and biochemical processes in the plant, and (3) theory of photoperiodism.—M.H.

ПОТАПЕНКО, А. О возникновении импульсов к зацветанию в точках роста. *Доклады Акад. Наук СССР*, Том 59. *No.* 6. стр. 1195-8. 1948.

POTAPENKO, A. [**Source of the stimulus for flowering located in the growing point.**] *Doklady Akad. Nauk SSSR*. **59.** 1195-8. 1948. **376**

There are interesting examples of the vegetative process in plants being partially or completely independent of any stimulus located in the leaves. Partial independence has been observed by the author in *Amaranthus retroflexus*, *Chenopodium album* and other short-day plants from high latitudes. There is indication that flowering in short- and long-day is of a different physiological nature, depending on whether the source of the stimulus is located in the leaves or the growing point. The initiation of the process of development in photoperiodically active plants apparently is determined by the action of the stimulus from both sources acting simultaneously. The impulses originating in the growing apex depend on plant age in their action. At the beginning of vegetation the impulses arise which stimulate vegetative growth, and at the end of the vegetative phase the impulses stimulate reproductive processes. Impulses produced in the leaves, on the contrary, act independently of leaf age, but depend on conditions of light and temperature under which the leaf exists. Thus both groups of impulses may or may not coincide, and in the author's experiments transference of the plants to short day in their young stage induced the production by the leaves of "florigen" at the time when the growing point itself was in the vegetative condition. As

" florigen " is more effective than the vegetative impulse the plant flowered when, according to age, it was not yet ready to do so. The capacity to flower in its dependence on age is manifest in the form of a secondary flowering of lateral shoots under long day. It is of special interest to note, however, that the impulses of the growing point activating the initial vegetative development are not destroyed but only temporarily " paralyzed" by the premature reproductive development under the influence of short day.

The acuteness of the photoperiodic reaction in plants is determined by the extent to which the activity of the leaf impulse overcomes that of the growing point. To illustrate this the author made grafting tests with the short-day species *Chenopodium album* and *Ch. urbicum*, the former being rapidly developed under short day and the latter slowly developed under the same conditions.—M.H.

CROP BIOCHEMISTRY

ZIMMERMAN, P. W., and HITCHCOCK, A. E. **Plant hormones.** *Ann. Rev. Biochem.* **17.** 601-6. 1948. [Boyce Thompson Inst. Plant Res., Inc., New York] **377**

GUSTAFSON, F. G. **Influence of light intensity upon the concentration of thiamin and riboflavin in plants.** *Plant Physiology* **23.** 373-8. 1948. [Univ. Michigan, Ann Arbor] **378**

Plants studied were tomato, bean, pea, maize and New Zealand spinach. Thiamin and riboflavin content were greater under high light intensity than under low light intensity or darkness. The effect was greater on thiamin than on riboflavin. These results are in line with the effect of light intensity on other vitamins, namely, ascorbic acid and carotene. The cause of the higher vitamin content of plants grown in light is not clear.

In albino maize converse results were obtained; the highest vitamin content was obtained under low light intensity. This is thought to be due to the destructive effect of light on vitamins. The destructive action of light on vitamins is direct and the beneficial effect is indirect through photosynthesis.—D.B.

ЛЕБЕДЕВ, С. И. Об изменениях содержания каротина в растении. *Доклады Акад. Наук СССР*. Том 58. *No.* 1. стр. 85-8. 1947.

LEBEDEV, S. I. [**Variation of carotene content in plants.**] *Doklady Akad. Nauk SSSR.* **58.** 85-8. 1947. [Lab. Plant Physiol. and Biochem., Bot. Gdn, Acad. Sci. UkSSR, Kiev] **379**

Much recent work has indicated that yellow pigments of the chloroplasts play an active part in the general metabolism of the plant organism. In *Cannabis sativa* and *Spinacea oleracea* carotene content in the leaves and stems increases up to the period of flowering but decreases at the end of the vegetative period. The leaves of the female plants of these two species during the period of flowering and to the end of the vegetative period have a much greater carotene content than have the leaves of the male plants; further, the reproductive organs of the female hemp plants also have more carotene than have these organs in the male plants, while the reverse is the case in the reproductive organs of spinach at the time of flowering. *Elodea canadensis* contains nearly as much carotene as do spinach leaves, and study of *Elodea* has been made from this point of view to elucidate problems of carotene content in relation to temperature and light factors in other plants.—M.H.

СОКОЛОВ, В. С. Влияние температурного фактора на содержание алкалоидов в растениях. *Природа, Москва* 1948. № 7. стр. 56-8.

SOKOLOV, V. S. [**The influence of the temperature factor on content of alkaloids in plants.**] *Priroda, Moskva* 1948. No. 7. 56-8. **380**

This work is concerned only with the effect of temperatures below 0°C. on alkaloid content of plants in the final stage of vegetation. It is necessary to consider date of harvesting when plant material with high alkaloid content is required. There is evidence that such content depends on precipitation and temperature. The first light frosts (0-2°C.) often lead to biochemical changes in plant alkaloids. The practical aspect of the problem is noted in regard to certain plants which constitute valuable feed for animals after the toxic alkaloids have been rendered harmless by autumn frosts; examples cited are *Veratrum* sp. and *Anabasis aphylla*. The author has studied many plants collected from the north (Leningrad area) and in Central Asia.

The following table gives details of alkaloid content of *Salsola richteri* from the Fergana plain:

Phase of development	Total alkaloid in % wt. air-dried plant	Per cent salsolina	Per cent salsolidina and other alkaloids
Seed formation	1.22	0.65	0.57
Seed ripening	1.26	0.73	0.53
Fruiting up to first frost..	1.18	0.62	0.56
Fruiting after first frost..	0.75	0.44	0.31

—M.H.

HENDE, A. V., BUCK, A. de, and LANCLUS, A. Over het bepalen van de ruwe celstof. [**The determination of crude cellulose.**] *Med. LandbHogesch. Gent* **13.** 193-220. [English and French summaries, pp. 217-9] 1948. [Lab. Toegepaste Phys. Anal. Scheikunde, LandbHogesch. Gent, Belgium] **381**

Certain disadvantages (enumerated) are attached to the Weende method of determining crude cellulose. A comparison was made of (1) the classic Weende method, (2) the Weende method as modified by the use of the Holdefleiss flask and by Puranen and Tomula (*Suomen Kemistilehti* 3. 85. 1930) respectively, and (3) Scharrer's method (Scharrer and Kurschener, *Biederm. Zbl.* 3. 302. 1931), the material used comprising different feeding stuffs (wheaten flour, forage mixture, grass, lucerne meal, barley straw) and pure cellulose. None of the methods are considered sufficiently exact for determining the indigestible substances concerned, and the desirability of finding a new method is noted.—From author's summary.

ANTONIANI, C., and FEDERICO, L. Sulla determinazione della vitamina B_1 nei tessuti vegetali col metodo al tiocromo. [**On the determination of vitamin B_1 in plant tissues with the thiocrome method.**] *Ann. Sper. agrar.* **2.** 51-4. [English summary, p. 54.] 1948. **382**

In applying the thiocrome method in the determination of vitamin B_1 in plant tissues, extraneous fluorescences, that hinder the determination, are often noticed.

The authors eliminate these extraneous fluorescences by a previous treatment of the tissue, after dehydration with sodium sulphate anhydrous, to extraction with ethyl ether.—From authors' summary.

BOSCH, S., and DEIJS, W. B. Het chemisch onderzoek van gewassen op het Centraal Instituut voor Landbouwkundig Onderzoek te Wageningen. [**The chemical analysis of plants at the Central Institute of Agricultural Research, Wageningen.**] *LandbVoorlDnst* Med. No. 53. 1947. pp. 68. [Cent. Inst. Agric. Res., Wageningen, Netherlands] **383**

An account is given of the work and methods of the Central Institute's Laboratory for Plant Analysis, from its institution in 1939 until October 1944 in charge of the late T. B. van Itallie. The statistical review of material dealt with from 1939 to 1946 shows it to consist of grass, dried grass, meadow hay, hay of clover and other such plants, silage, potatoes and potato straw, beet and beet leaves, turnips and leaves, other roots and tubers, green forage (kale, etc.), cereals and pulse, straw, and oil seeds. Samples are received from official sources and from private individuals. Methods of analysis are described. Tables review the chemical composition (mean, maximum and minimum figures for a given number of samples) of material analysed in the years 1940 to 1944 inclusive. The questionnaires to be filled up by those who send in samples are reproduced.—G.M.R.

ENVIRONMENTAL STUDIES

PRAGUE, Institute for International Collaboration in Agriculture and Forestry. **International co-operation in crop improvement through the utilization of the concept of agroclimatic analogues.** By *M. Y. Nuttonson.* 1947. pp. 8. **384**

"The purpose of this paper is to formulate an agronomic and horticultural approach to ecology, and to promote research along the lines of crop ecology as it affects plant adaptation, plant introduction, and the exchange of varietal plant material among the various agricultural areas of the world." A close study of considerable data relating to past introduction of agronomic and horticultural plants reveals a given variety of wheat or corn to be very similar in its phenological behaviour in areas of similar climatic and latitudinal conditions while in areas of diverse climatic and latitudinal conditions the phenological behaviour of a given variety is distinctively dissimilar and often varies greatly. As a result of the above deductions a series of studies dealing with North American agroclimatic and latitudinal analogues for various countries of the world have been undertaken by the author (See *Field Crop Abstr.* Vol. 1. Abs. 897-903.) These analogues are based on purely physical data but it is intended to check and improve on these by the use of carefully recorded phenological data of various crops of a given country and to establish uniform field tests of selected horticultural varieties of a few major crop species in various geographical areas of similar climatic and latitudinal environments.—G.M.H.

WHITMORE, Joan S. **Agro-Climatology. The scope of its application to S. A. Agriculture.** *Fmg S. Afr.* **23.** 293-303. 1948. [Divn Agric. Educ., and Res.] **385**

This is an introductory article dealing with the salient climatic features of the Union. "Reflected in the physiology and natural vegetation of a region, climate has a large measure of control over the land-use potentialities and through its restrictive factors, such as extremes of temperature or precipitation, it governs the degree of intensity of utilization which the inherent qualities of the environment are capable of supporting." Notes are given on the latitudinal position of the Union and its climatic implications, physiography, winds, precipitation, and temperature and the importance of agro-climatic studies in the provision of fairly accurate estimations of zones in which the various agricultural crops can be expected to grow successfully provided that the appropriate cultural practices are applied and that there are no peculiar extraneous features.

Maps show the seasonal distribution of rainfall and the percentage falling during the summer months. The first month in spring with more than 1 in. rainfall the duration of the rainy season, the month of maximum precipitation, evaporation—precipitation ratios and hythergraphs for Vruchtbaar (Wellington) which resembles that of Lisbon, and Nelspruit, which resembles Salta a town in the Argentine characteristic of the Andean foothills.—G.M.H.

MERINO y CORONADO, J. El régimen de lluvias de San José. [**Rainfall at San Jose, Costa Rica.**] *Rev. Agric. Costa Rica* **20.** 89-90. 1948. [Director, Meteorological Service, Costa Rica] **386**

The normal rainfall at San José is described on the basis of over 60 years' records, and the rainfall for 1947 is compared with the normal. The author explains the value of rainfall records for agricultural planning.—G.M.R.

BOSSO, J. A., and BURGOS, J. J. Condiciones agroclimáticas de la región de Carmen de Patagones. [**Agroclimatic conditions of the Carmen de Patagones region, Argentina.**] *Rev. argent. Agron.* **15.** 137-59. 1948. [Div. Prot. Meteor. Agric. (J.A.B.) and Dept. Meteor. Agric. (J.J.B.), Argentina] **387**

Naturalists from Charles Darwin onwards have commented on the exceptionally mild climate and successful plant cultivation of the region of Carmen de Patagones, situated 40°50′S. and 62°55′W. on the north bank of the Rio Negro, Argentina, and Viedma, situated a little farther west on the south bank of the same river. The climate is localized within a limited region, namely, the valley of the lower reaches of the river together with the adjacent meseta, and differs very considerably from that of the neighbouring regions. The present study is based on a tour of investigation made by one of the authors and on the official meteorological records of the region and, for comparison, those of other regions such as Port Madryn, Trelew, etc. The climate resembles that of the Mediterranean, especially where thermal conditions are concerned. It is characterized by a medium amplitude of annual variation, a fairly long period free of frost, and relatively low cryokindynoscopic indices. (The cryokindynoscopic index of a given locality is defined as the normal temperature of the day after which or, in the case of autumn frosts, before which frost occurs only in 20 per cent of the years. J. J. Burgos: Seventh International Congress of Agricultural Meteorology, Toronto, 1947.) It is exceptional in Argentina to find these climatic characters simultaneously. Low annual rainfall (319.5 mm.) causes, in addition, the summer drought common to climates of Mediterranean type. The peculiarity of the regional climate is attributed to its geographic situation and the atmospheric circulation to which it is subject, and its striking resemblance to the climate of the lower Rhone valley in France suggests the suitability of using the land concerned, which is almost virgin and some 50,000 hectares in extent, for certain valuable cultures. Irrigational facilities are projected but not yet completed.—G.M.R.

KERÄNEN, J. Suomen sääolot vuosina 1930-45. [**Climatic conditions in Finland from 1930 to 1945.**] *Maatalous ja koetoiminta* **1.** 24-36. 1946. [Govt. Metereological Station, Finland] **388**

As crops are grown in Finland as far as 60° north, climatic conditions, temperature in particular have a very great effect upon growth. The harvest returns for a period of approximately 200 years show that out of every 10 years there have been 2 in which the harvest was a failure and 3 with a harvest below the average. The most recent serious failures took place in the 1920's namely, 1923, 1928 and 1929.

After 1930 an important change took place in the climate, principally in relation to temperature. From 1930 to 1945 the principal months of the growing season, namely, May to August, were warm, and throughout that period not a single cool summer occurred. This abnormally long period of warmth has had a great effect on the development of crop growing in Finland.

In the 1930's the winters were also abnormally warm, but in the 1940's three unusually severe winters have been experienced, namely, 1940, 1941 and 1942. A snow cover in the middle of March is very common.

Frosts can cause heavy damage to crops, especially in the north of Finland. Frost can occur in the early summer, in June, but the damage is greatest in August. From 1930 to 1945 frost damage was of a local type only.

Drought in the early summer, May and June, is characteristic of the Finnish summer. The 4-year period 1939-42 had exceptionally little rain and crop growth suffered severaly from drought, especially in the years 1939, 1940 and 1941.—O.V.

VALLE, O. Pakkastalvi 1946-47 ja sen vaikutus peltokas-viemme talvehtimiseen. [**The severe winter of 1946-47 and its effect on the wintering of crops.**] *Maatalous* 1947 No. 6-7. 86-90. [Professor, Cent. Agric. Exp. Sta., Tikkurila, Finland] **389**

The winter of 1946-47 was abnormally cold in Finland and there was little snow. During this period it was possible to make many valuable observations, and material was collected by the

Central Agricultural Experiment Station at Tikkurila near Helsinki. February is the coldest month with a mean temperature of -7.0°C., but in 1947 the mean temperature in February fell to -14.6°C. At the same time the cover of snow was extremely shallow, at the most 5 cm. The minimum daily temperature fell from the 5th to the 15th February to under -20°C. As March also was abnormally cold, the frost penetrated deeply into the ground. In sandy soil frost was found at approximately 120 cm., in clay soil at about 100 cm., but in moist peat soil at about 65 cm. From the peat the frost disappeared by May 16th, from the clay by May 23rd, and from the sand by May 26th, after the spring sowings had already been done.

After the abnormally severe winter with extremely shallow protective cover of snow, winter killing was unusually rare. Because of the thin snow cover, no damage from *Fusarium* occurred in the winter cereals. Damage from frost also was unusually insignficant. Certain Swedish winter rye and winter wheat varieties which generally suffer in the winter were undamaged. This showed that the deficient winter-hardiness of some foreign varieties is based more on attack by plant disease than on damage caused by frost. In a trial of sowing autumn wheat at different times, severe winter damage was observed only after very early sowing, but no explanation of this result could be found.

Some other crops, and herbage plants in particular, exhibited good wintering capacity. Red clover thinned out considerably, but that did not take place until later in the spring. A new biennial oil plant, winter turnip rape, also exhibited good winter-hardiness.—O.V.

KERÄNEN, J. Halla ja sen torjunta. [**Frost, and protection from it.**] *Maatalous ja koetoiminta* **2.** 37-46. 1947. **390**

On account of Finland's northern situation frost causes great damage to plant growth and is a factor limiting crop husbandry. Damage from frost is greatest in the north and west, less serious in the south and in the great, inland lake region. Spring frosts are commoner in the west and south. In the north, frosts in the late summer and autumn are more common.

In northern Finland, where the greatest damage is produced in potatoes, oats, and spring-sown wheat, means of warding off frost have been sought. A protective apparatus constructed by T. Laine has come into use, in which moist vapours are formed by means of sulphur trioxide.—O.V.

UNITED STATES Department of Agriculture. Circ. No. 774. **Local climate in the Copper Basin of Tennessee as modified by the removal of vegetation.** By *C. R. Hursh.* 1948. pp. 38. **391**

Copper smelter fumes have resulted in a bare soil zone of about 10.5 square miles surrounded by concentric zones of grass and hardwood forest. Within each of these cover conditions continuous records of temperature, wind velocity evaporation and rainfall have been recorded for 4 years, 1936-39. The data are summarized in this circular. Each vegetative zone now possesses a distinctive local climate. Soil temperatures show greater difference than do air temperatures. At full leaf, the mean daily range of soil temperature at 1.2 in. depth was 33.5°F in the bare area as compared with 10.9°F. in the forest. Total yearly evaporation was: bare zone 56.95 in., grass zone 46.19 in., forest 17.76 in. Possible applications of data of the type recorded are outlined.—K.J.S.

SANDERSON, M. **An experiment to measure potential evapotranspiration.** *Canad. J. Res.* Sect. C. **26.** 445-54. 1948. **392**

Equipment is described for obtaining daily values of potential evapotranspiration, i.e., the amount of water that will evaporate and transpire from a vegetation-covered land surface while the root zone of the soil is well supplied with water (Thornthwaite). Thornwaite's formula $E = P + I - 0$ where P is precipitation, I is intake and O is overflow was tested for Toronto conditions and verified. One season's measurements of the daily water loss from a grass-covered area showed the same value for plots carrying a dense cover of timothy and for plots carrying a sparse growth of crested wheat grass.—K.J.S.

BOOKS AND PERIODICALS

(*For other books reviewed in this issue, see Abs.* 3, 57, 66, *and* 74).

WHYTE, R. O. **Farming for industry.** 19 × 13. pp. 160. London: Todd Publishing Group Ltd., W.1. 1948. 7s. 6d. [Commonwealth Bureau, Penglais, Aberystwyth] **393**

An extract from the author's introduction will indicate the magnitude of the problem involved by the claims on land areas for (1) the production of crops for human food and animal fodder, and (2) the production of animals and plants to meet the demand of manufacturers for raw material. "..... the sources, quantities, qualities and types of primary products produced by crop cultivators and animal husbandmen for the use of industry are subject to constant change under the influence not only of the major land use factors and developments in farming systems outlined, but also of the great economic, sociological and political changes which are occurring everywhere. India, formerly a major source of oilseeds, now uses most of her production to provide the food and industrial needs of her own population. Bengal has formerly produced some 90 per cent of the world's jute; now the economic and political upheavals in that part of the world are leading the users of jute fibre to look to other plants and other parts of the world for alternative sources. The shortage of dollars is leading many countries to look for other alternative sources for linseed oil for paint, oils for lubricants and cake manufacture, cotton, flax and many other industrial products formerly obtained from hard currency countries.

" All these developments make it essential for Governments and private industrial organizations to conduct intensive research at all levels on the cultivation, production and utilization by industry of the required animals and crops. At the cultivation level Government Research Stations and Departments of Agriculture are continually trying out new crops or new methods of cultivation, as well as breeding new improved types of existing crops or animals, better adapted to the environment or more resistant to disease. The jute industry of India has its own research organization, and the Empire Cotton Growing Corporation has a wide-spread organization charged with the task of extending cotton cultivation in the British Commonwealth and Empire.

" At the other end of the chain, the various industries have formed joint organizations with special research laboratories to study all aspects of the processing and manufacture of the product in the form in which it is provided to them by the agricultural industry. Paint, leather, flax, wool and cotton are all provided for in this way. These research and other organizations represent not only an attempt to produce the best type of industrial product to meet modern needs, but are also useful in defending the industries based on natural products against the competition of the synthetics. .... The demands on the land and on the productive capacity of farmers will be so great in coming decades that it will be essential to use everything that is produced, either as the main product or as by-products, and research to this end deserves full support."

The book contains a fund of interesting information regarding leather, oils, tobacco, rubber, fibres, and miscellaneous by-products from the production of animals and plants, while the main objective of the author is to advocate conservation of the earth's vegetative cover by developing the farming systems suitable for regions studied with this end in view.—M. Hall.

TANNEHILL, J. R. **Drought, its causes and effects.** 21 × 14. pp. 276. London: Oxford Univ. Press. 1947. 15s. **394**

Any relationship which the title of this book may have with aridity is certainly not reflected in the contents. The author has maintained his very readable style, already familiar from his " Hurricanes: Their Nature and History " and " Weather Around the World " and has presented his present work in a most fascinating and interesting form.

The problem of drought and the significance of its associated evils upon the peoples of the world are examined. There follows a review of the history of droughts in the United States and of the rainfall records and related weather data. Finally by putting " together the pieces of this great puzzle " the author attempts to give some satisfactory explanation for the occurrence of drought and examines the possibility of predicting drought in the future.

The Pacific Ocean is regarded as the dominating factor controlling the national precipitation. Relating barometric pressure readings and rainfall statistics of some Pacific Coast towns, the author demonstrates how low national precipitations have occurred during the years of highest pressure and *vice versa.* The influence of the Pacific however is exerted far beyond the immediate coastal region. Because of the mountain barrier, this influence is exercised through the upper air. " A relatively cold ocean will cause pressure to be high over the North Pacific and to be low over the northern United States. Low pressure in the northern United States is unfavourable for rain because (1) fewer cold air masses come from Canada to cause precipitation in the warm moist air and (2) more frequent winds blow from the dry Southwest and divert moist air to the east and northeast."

Fluctuations in rainfall, consequent upon shifts in temperature and pressure are also influenced by changes in the sun's position and heat. There is but little data relating to the effects of sunspot activity, but generally, when sunspots increase in number, more rain falls during the first half of a year. When sunspots are numerous more precipitation tends to reach the interior, including the Great Plains. There is sound evidence to show that when the sun's heat is unusually great, or when oceans are relatively colder than usual at the time of maximum sunspot activity, rainfall is diverted still further into the interior. During periods of sunspot activity, the sun gives off more heat; heated equatorial air rises and flows polewards and is replaced by a flow of low, cold polar air. An increased rainfall results from these temperature changes. When less heat is radiated by the sun, Canadian air is less cold, the temperature contrast with the United States lessens and less rainfall results.

Long-term weather records indicate a gradual progress towards higher national temperatures. Deforestation, cultivation and land clearance for constructional work may be responsible for failure of rain. The author maintains that a remarkable change of climate would take place in the United States if all the vegetation cover were removed. The following spring temperatures would rise at an abnormal rate ; there would be a rapid temperature contrast between the Pacific and the land ; " the change of wind circulation would be disastrous for further growth of vegetation over large areas. 'Hot winds of the plains' would dominate the weather in the interior and the moist winds of the Atlantic and Gulf would be turned to the north and north-east with deficient precipitation even in eastern areas. As long as we did not fully understand the causes of drought, we discounted prophecies of deteriorating climate. But now that we know how widespread and persistent is the control of the Pacific Ocean in relation to the rainfall of the continent as a whole, we can see that any tendency toward an increase in the temperature contrast between continent and ocean in the spring and early summer months will deprive us of rainfall at the very time of year when it is most important for agriculture."

Briefly reviewing some of the wide changes in climate which have taken place in the past two thousand years, the author concludes that rainfall for the United States as a whole may be expected to continue to vary between limits of moderate deficiency and rather serious excess, with occasional droughts. "These will probably be somewhat more severe than those in the immediate past if deforestation and cultivation continue to expand. But there is no good reason to think that occasional droughts will become a great deal worse than in recent climatic history as long as we have extensive frozen seas in the polar regions and snow-covered land in winter on the northern part of the continent. Nevertheless, our national rainfall in relation to crop production seems to be critically balanced at about twenty-nine inches. Serious consequences result from persistent national deficiencies of 10 per cent or more and we have a problem that will require careful study and planning if we are to avoid national disaster."

This book points the way to that 'careful study and planning.' Much work still remains to be done, but as our knowledge of the phenomena which influence rainfall increases we may soon see the day when droughts may be accurately forecast.—P. Mackintosh.

ÅKERMAN, Å., TEDIN, O., and FRÖIER, K. [Editors] **Svalof 1886-1946. History and Present Problems** English Tech. Editor,—*R. O. Whyte.* 24 × 17. pp. 389. Lund : Carl Bloms Boktryckeri. 1948. 37s. 6d. **395**

This volume contains a collection of articles by present and former members of staff of the Plant Breeding Institute of the Swedish Seed Association at Svalöf, in Skåne, Southern Sweden, presenting the history and present position of the research on a wide range of crops. Since the emphasis throughout is on plant breeding, merely a list of the articles relevant to this abstracting journal is given, and readers are referred to *Plant Breeding Abstracts* for more details.

LJUNG, E. W. The Swedish Seed Association its Foundation, Organization, Development and Activities
ANDERSSON, K. The Climate and Soils of Sweden.
ÅKERMAN, Å., and MAC KEY, J. The Breeding of Self-Fertilized Plants by Crossing.
ÅKERMAN, Å. The Breeding of Wheat.
ÅKERMAN, Å. The Breeding of Oats.
NILSSON-EHLE, H. The future Possibilities of Swedish Barley Breeding.
LJUNG, E. W. The Rye Breeding Work of the Seed Association.
JOSEFSSON, A. Breeding of Root Crops.
ANDERSSON, G., and OLSSON, G. Oil Plants.
GRANHALL, I. Flax and Hemp.
By several authors. Various crops (Hops, Lupin, Maize, Rubber, Dandelion, Tobacco).
ÅKERMAN, Å. Local Plant Breeding and Testing at the Branch Stations.
AKERBERG, E. Conditions of Cultivation and Breeding Problems for Cereals and Herbage Plants in Norrland.
LEVAN, A. The Cyto-genetic Department 1931.
MÜNTZING, A. Experiences from Work with Induced Polyploidy in Cereals.
GUSTAFSSON, Å., and MAC KEY, J. Mutation work at Svalöf.
LINGBERG, J. Cereal and Chemistry Laboratories.

—R. O. Whyte.

REPORTS

Great Britain. National Institute of Agricultural Engineering Report for the year ending August 31, 1946. Askham Bryan 1946. pp. 14. **396**

England and Wales, Ministry of Agriculture and Fisheries Agric. Overseas Rep. No 2. Farm buildings in North America. 1946. pp. 22. **397**

The Farm Buildings Committee, in its report to the Minister of Agriculture and Fisheries recommended that a mission be sent to Canada and the United States to study farm buildings. The report of the mission covers the following : livestock buildings, silos, storage buildings for machinery and crops, materials and methods of construction, ventilation and insulation, layout, research and advisory work, capital investment in farm buildings and rural refrigeration and heating. Trials of various American and Canadian methods and structures are recommended.—P.M.

Eire. Sixteenth Annual Report of the Minister for Agriculture 1946-47. pp. 87. Dublin. **398**

Denmark. Report from the Danish State Seed Testing Station for the 76th working year from 1 July, 1946 to 30 June, 1947. København, 1948. **399**

The number of samples tested was 52,185 ; this is 5025 fewer than in the previous year, which with its 57,210 samples represents the record hitherto attained in the history of the Station. Working conditions were rendered somewhat difficult owing to lack of accommodation and of trained staff. From 1 August, 1946, the Station's 1939 fees have been increased by 50 per cent. In the spring of 1947 the new barley variety " Alfa" was placed on the market by the Seed Testing Station. The number of seed lots sealed was 4496 compared with 3589 in the previous year.—R.P.J.

Netherlands. Central Institute for Agricultural Research (Centraal Instituut voor Landbouwkundig Onderzoek), Wageningen. Report for 1947. pp. 84. **400**

II. Department of Crop Husbandry. (a) Cereals. By *W. H. van Dobben.* Problems studied were time of sowing, seeding rate, spacing, weed control, application of nitrogenous fertilizers and time of application. The effect of the number of plants and use of N on grain quality in summer barley (under the conditions of the trial and with a grain weight of 40 grm., seeding rate should not exceed 100 kg. per ha., and the application of N should not exceed 60 kg. pure N per ha.). The effect of climate on tendency to sprout in wheat. Trial of varietal differences in tendency to sprout : wheat, barley, oats. (b) Pulse and some new crop plants. By *W. R. Becker.* Experiments were concerned with pulse and the possibility of obtaining better quality grain through early harvesting ; varietal trial of soybeans ; spacing trial with maize ; spacing trial with peas ; varietal trial of maize ; the processing of Netherlands poppy for morphine. (c) Potatoes. By *A. J. Reestman.* (d) Fibre plants. By *J. C. Friederich.* Work in progress included flax varietal trials ; flax selection for length, lack of branching, earliness, and rust resistance ; comparison of different concentrations and doses of weed-killers for weed control in flax fields ; and study of the flax rust caused by *Melampsora lini* (Pers.). (e) Production of fine seed. By *J. C. Friederich* and *V. Tchernoff* An enquiry was made into grass seed production and the pertinent literature was studied, and other work was concerned with the production of seed of turnips and spinach. (f) Storage. By *W. H. de Jong* and *N. Krijthe* (potatoes), and *J. J. I. Sprenger* (the drying of cereals). (g) Studies of nutritive value, principally in potatoes and pulse and by means of chemical analysis, by *A. Veenbas.* (h) Study of nematodes and means of control, by *J. W. Seinhorst.* (i) The breeding of potatoes resistant to *Phytophthora*, by *B. M. Bakker.* (k) Sweet lupins and the maintenance of land races, by *H. Lamberts.* Sweet lupins (alkaloid-free *Lupinus luteus*) introduced into the Netherlands and reproduced there have become seriously adulterated by bitter lupins. Breeding for the elimination of the bitter forms and the production of sweet lupins especially adapted to the Netherlands has begun.

III. Chemistry Department. Report by *W. B. Deijs* and *S. Bosch.* The number of routine analyses made in the year ending April 1947 was 33,926. Special studies were concerned with the adaptation of the methods used in making microchemical soil analyses to the determination of minerals in plant material, dried and green ; the determination of trace elements in grass and hay ; and study of the carotene content of dried grass (see *Herb. Abstr.* 18. Abs. 1162). IV. Botany Department. Report by *H. L. v. d. Sande Bakhuyzen* and *H. G. Wittenrood.* Research was mainly devoted to phases of growth and development, especially in the sugar beet. It was found that (i) each phase requires for its completion environmental conditions (temperature, daylength etc.) of given quality and in given quantity ; (ii) each phase of growth is characterized by the forming of a specific (hormone-like) substance, and the completion of the phase is characterized by the reaching of a threshold concentration of the substance and (iii) each phase of growth is characterized by the fact that the distribution within a phase is constant, as shown in sugar beet investigations. An article on this subject is in the press. Other work included tests of resistance to cold in strains of wheat and rye; the induction of flowering in *Helianthus tuberosus* by means of grafting *H. annuus*; a study of the minimum number of long days necessary to influence flower inititiation in wheat and rye (apparently 4 days); experiments in the total defoliation of sugar beet at the end of July in order to ascertain the degree of xeromorphy in the leaves formed in the different growth phases; study of the quantitative effect on flower initiation in various short-day plants of flashes of light applied at different moments during the period of darkness (night).

A list of work published by the Institute in 1947 is appended to the Report.—G.M.R.

NETHERLANDS. T.N.O. Agricultural Experiment Station and Soil Science Institute (Landbouwproefstation en Bodemkundig Instituut T.N.O.), Groningen. Report for 1947. 1948. pp. 68. **401**

The work of the Institute is concerned in the main with soil investigations and soil mapping, but includes a certain amount of botanical research. Root development was studied in potatoes, rye and sugar beet. The effect of different degrees of soil acidity upon the shape of beet was tested in pot trials, but with inconclusive results, and this experiment is being repeated.—G.M.R.

NETHERLANDS. General Inspection Service for Agricultural Seed (Nederlandsche Algemeene Keuringsdienst). Fifteenth annual report. 1946-47. Wageningen, 1947. pp. 78. **402**

The General Inspection Service is centred at Wageningen, and under it work separate provincial services, some of which have their own experiment farms, others laboratories, etc. The newly formed North-East Polder is now recognised as a separate region for inspection purposes.

Because of the heavy demand for seed, coupled with a certain amount of exporting, the standard of requirements had to be lowered in some cases. Thus the normal requirement in germination capacity is 80 per cent and over in spring wheat, but 70 to 80 per cent was permitted, such seed being known as "utility seed" (noodzaad). Germination capacity requirement in oats was reduced to 83 per cent. By demanding at least 83 per cent germination capacity in flax seed, it is hoped to break up the traffic in flax seed adulterated with old seed.

Statistical tables appended to the report show the areas under inspection as occupied by different crops and varieties at different stages of reproduction, with the areas passed and rejected respectively. —G.M.R.

SIERRA LEONE, Annual Report of the Department of Agriculture for the year 1946. Freetown, 1948. pp. 32. **403**

Section 1 reviews the general policy of the Department of Agriculture and the work initiated or extended in 1946 for the adequate provision of food for the people, the cultivation of money crops and the exploitation of wild trees for export purposes, research, soil conservation, etc. Section 2 reviews the work of the Agricultural Department and gives notes on the experimental work being conducted at Njala, Rokupr, Bonthe, Makeni, Kenema, Newton agricultural stations and the Teko stock farm.—G.M.H.

AFRICA, GOLD COAST Report on the Department of Agriculture for the Year 1946-47. pp. 16. Accra, 1948. **404**

KENYA, Department of Agriculture Annual Report 1946. Parts I, II, and III. pp. 218. Nairobi. 1948. **405**

A review in Part 1 of the weather, agricultural exports, crops, livestock produce, production in native areas and locusts, for the year 1946 is followed in Part II with the policy of work of the Department of Agriculture and in Part III by Sectional Reports submitted by the responsible officer in the various provinces, districts, services, sections and departments.—G.M.H.

AUSTRALIA. Twenty First Annual Report of the Council for Scientific and Industrial Research for the year ended 30th June, 1947. pp. 139. Canberra, 1947. **406**

Section II of this Report, which covers all scientific investigations carried out by the Council during the year ending 30 June, 1947, gives notes on plant investigations conducted during the year. Pasture investigations are reported (See *Herb. Abstr*).

Vegetable oil plants under trial at one or more centres include varieties of soybean, linseed, sunflower, groundnut, castor bean, safflower, rapeseed and sesame. Importance is attached to these crops because of the dependence of Australia on overseas supplies and because vegetable oils are among the few potentially valuable crops for the Northern Territory.—G.M.H.

CANADA. Annual Report 1946-47 of the Canadian Seed Growers' Association Inc. Ottawa, 1946. pp. 86. **407**

The report includes papers presented at the Annual Meeting in June 1947 dealing with the following: disease prevention in field crops; the ergot disease of grains and grasses and its control; the control of smuts in cereals; a brief on loose smut; a health approval plan for beans; the production of bean seed free from disease in Quebec and seed production and distribution from 1939 to 1947.—P.M.

UNITED STATES DEPARTMENT OF AGRICULTURE. Report of the Chief of the Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration. 1947. **408**

Possibilities of complete mechanisation of the peanut crop are foreseen, as a result of co-operative work with the Georgia A.E.S. The old belief that peanuts must be allowed to cure before the pods are removed from the plants has been proved to be unfounded. Experiments have shown that it is possible to mow off the peanut tops and then dig and artificially cure the pods without impairing the yield or the quality.

Cereal research is concerned with making possible more stable and efficient production by developing varieties that produce well despite hazards of disease and insect pests and weather extremes. The object is to produce superior varieties of cereal crops for each section of the country. Varieties have been developed to meet certain demands, e.g., waxy corn and sorghums adapted to combine harvesting. Practices in planting, cultivating, fertilizing and harvesting have been investigated by other research projects. In close co-operation with cereal research have been investigations for the control of weeds by cultural and crop production practices and the use of chemical herbicides.

Minerva, a new flax variety, is noted. It has an unusually high oil content and excellent drying quality; it is moderately resistant to rust, wilt and pasmo and is best adapted to the North Central States. Observation of cold injury to flax indicate that varieties differ greatly in their ability to withstand freezing temperatures in the early stages of growth. In Minnesota, one station recorded minimum temperatures of 26° and 28°F. on two successive days; none of the varieties were injured. At another station, a minimum temperature of 22°F. injured all varieties in varying degrees. A third station in the state recorded 18° and 19°F. and a considerable range in extent of damage resulted. Temperatures of 19° and 17°F. at Fargo in North Dakota caused a complete kill of all varieties. At all these stations, the plants ranged in size from those just emerging to heights of 3 or 4 in. Seedlings appeared more resistant to freezing than did taller plants.

New varieties of cotton referred to include a new wilt-resistant strain of Empire cotton, showing great promise in yield and fibre quality for production in Georgia and other south-eastern states; Acala 4-42 adapted to California and having fibre quality superior to the best strains of the Californian type; and a new type of fuzzless or naked seed which behaves in crosses as a simple recessive character, suggesting it may be readily transferred to other varieties.

Investigations with sugar beets and sugar sorghums include extensive research into mechanisation of production operations, the breeding of varieties that rank higher in yielding capacity and quality and are improved in disease resistance and better suited to the application of machine methods in cultivating and harvesting. See also *Herb. Abstr.*—P.M.

UNITED STATES, Report of the Secretary of Agriculture, 1947. pp. 152. Washington, 1947. **409**

IOWA STATE COLLEGE OF AGRICULTURE—Report on Agricultural Research for the year ending June 30, 1947. Part I—Project reports, publications, staff financial statement Part II. Iowa Corn Research Institute. Twelfth Annual Report. Ames, Iowa, 1947. pp. 363. **410**

Progress reports on some 260 active projects are presented.—P.M.

AMERICA, Michigan State Board of Agriculture 1947. Eighty-Sixth Annual Report of the Secretary of the State Board of Agriculture of the State of Michigan and Sixtieth Annual Report of the Agricultural Experiment Station from July 1, 1946, to June 30, 1947. East Lansing, Mich., 1947. Vol 42. No. 11. pp. 315. **411**

UNITED STATES OF AMERICA, St. Thomas, Virgin Islands. Report of the West Indian Conference, Second Session, February 21 to March 13, 1946. Washington, D.C., 1946. pp. 86. **412**

A report of one Committee refers under the head of agricultural diversification to intensive use of land, cheapest sources of food supplies, significance of mixed farming, and other items.

The realization of the objective of intensive use of land must provide in all cases for the maintenance of soil fertility and land rehabilitation. " In order to ensure that crops are grown only in those areas which are both ecologically and economically suitable, a land utilization plan—including provision for equitable distribution of land appropriate to particular areas—is essential. A regional cropping programme may ultimately be necessary. A soil survey is a most desirable aid in formulating such a plan."

" In order to obtain the greatest advantage from diversified agriculture, the keeping of live stock must be an integral part of any farming system. An efficient system of mixed farming will provide the means of regenerating soils and maintaining their fertility and will contribute toward the improvement of the diet and the security of the food supply of the people by making available increased supplies of fresh protein foods such as milk, meat, and eggs."—R.O.W.

COLOMBIA. National Department of Agriculture (Departamento Nacional de Agricultura). Reports for 1946 and 1947. Bogotá, 1946 and 1947. pp. 478 and 364. **413**

The Reports are mainly concerned with the activities of the Institute of Biology and those of the five regional Agricultural Experiment Stations together with some specialist substations.

In 1947, at the invitation of the Government, an agricultural mission composed of five specialists from the United States arrived in Colombia to work in an advisory capacity for an initial period not exceeding one year. The mission is to study the following special problems: the organization of the experiment stations; the organization and development of extension work; the improvement and development of animal husbandry; research and education in agricultural engineering; and the practice of irrigation. In addition the mission is studying agricultural education, problems in regard to the storage of grain (wheat and rice) and potatoes, and the general organization of agriculture in Colombia.

Wheat, its breeding, cultivation and panification quality, is studied at the Agricultural Experiment Station of La Picota, situated in the upland, wheat-growing Cundinamarca province, and some work is done with oats and barley. The regional reproduction of cereal seed is also under the supervision of this Station. Rice and cotton are subjects of research and breeding at the Palmira Experiment Station in the province of Valle; and maize, rice, cotton and oil plants are studied at the Armero Station. At Palmira studies of the hour of flowering in five rice varieties have been made, and a preliminary report shows that between the 7th and 11th Sept. 1946 maximum flowering took place between 12 noon and 2 p.m., temperature being observed to exercise a relative influence on intensity of flowering. The work of the Palmira Cotton Division is concerned largely with varietal trials, the acclimatization of varieties, and experiments to determine the optimal time of sowing. Maize is bred at the Armero Station; work with rice is as yet confined to the collection of material, studies of cultural technique and of varieties and their acclimatization. The rice research projects at this Station require irrigation facilities which are in process of construction but are not yet complete. Cotton work at Armero covers varietal trials, breeding, and the production of certified, bred seed of the varieties "Express del Brasil" and "Deltapine 12." The Station also undertakes the commercial classification of cotton grown in its region. In addition to the work with cotton, a collection of other fibre plants such as *Musa textilis*, *Boehmeria nivea*, *Corchorus* spp. and others is being made for possible future study. Work with oil plants comprises varietal trials of *Sesamum indicum* and *Arachis hypogaea*. The new bred strains of sesame from Venezuela, Venezuela 51 and Venezuela 52, are among those considered especially promising, but an abnormally intense summer in 1947 destroyed practically all the sesame crops. The Oil Plants Division of the Armero Station also studies legumes, including soybeans, for various purposes. Cultural technique in connexion with all these crops is a subject of experimentation by the Soils and Cultivation Division of the Station, which studies the time of sowing, density of sowing, the manuring of cotton, and the rotation of crops combined with green manuring (with *Crotalaria*). The Sevilla substation in the Magdalena province conducts trials of cotton, legumes including soybeans, rice, sesame, groundnuts, mandioc, and sunflowers, among other crops. The Medellín Agricultural Experiment Station, located in a temperate climate, includes in its work the breeding of maize and varietal trials of various legumes for green manure, cover crops, soil stabilization, or herbage. Varietal trials of rice, maize, cotton, mandioc and legumes are conducted also at the Mompos substation.—G.M.R.

GUATEMALA. National Institute for Crop and Animal Husbandry (Instituto Agropecuaria Nacional). Report for 1946, by W. C. Davis and R. Rivera A. pp. 51. [Received 1948] **414**

The report is the first published by the Institute, which has been established under the Governments of Guatemala and the United States. Its aim is the study and improvement of crop and animal husbandry in Guatemala, with a view of improving at once that country's own resources and standard of living and the production of the tropical and subtropical commodities consumed in the U.S.A. Work was begun in September, 1945.

The Institute occupies the Chocolá Experiment Station and a sub-station also, and is organized in eight departments (soils, agronomy, horticulture, plant anatomy, agricultural chemistry, pathology, animal husbandry, agricultural engineering) and a library. Among the activities of the Soils Department are a study of erodibility on the Guatemalan mountain slopes and the classification of the country's soils, which are found to be mostly of neutral reaction and to have an abundance of potassium, although many are deficient in nitrogen and phosphorus. The Departments of Horticulture and Agronomy have under observation more than 1150 introduced plants. Special attention is being paid to maize, 363 varieties being at present under observation for selection work, and to *Calathea lutea*, a promising indigenous oil plant of luxuriant growth in the humid lowlands of Guatemala, among other crops. Rice in Guatemala is commonly inter-cropped with maize, but an experiment is in progress at Chocolá to ascertain whether it cannot be grown in adjacent furrows without affecting the quantity of the product. Three bred strains of *Sesamum indicum* from Venezuela are being grown for seed. Some cotton selections are under observation at Chocolá for their behaviour in regard to diseases and pests, and another fibre plant under observation is ramie (*Boehmeria nivea*), fourteen varieties of which have been introduced from Cuba and are being grown in comparison with a Guatemalan wild variety found at Chocolá.

The report contains further information on work with horticultural and medicinal plants, and rubber, and on extension work and co-operation with other organizations.—G.M.R.

NEWS ITEMS AND SCIENTIFIC NOTES

Great Britain

New publication 415

The first number of the N.A.A.S. Quarterly Review (1948: No. 1; The Journal of the N.A.A.S.), published by the Ministry of Agriculture and Fisheries has recently appeared. It contains articles, abstracts and provincial notes.—G.M.H.

Trailer Crop Drier 416

The Aldersley All-Crop Drier has recently made its appearance. It consists of a mobile drying unit weighing 2.5 tons, with flexible canvas couplings connecting the hot air ducts to specially constructed trailers. There are two trailers, both of which are used for collecting the crop: when attached to the drier they take the place of drying trays. Both trailers can be connected to the drier the one having hot air circulating through it and the other having cold air circulating for cooling.

The plant dries grain, cereals in the sheaf and grass. At a recent trial, trailers were half loaded with more than half a ton of lengthy material, saturated with dew. Drying was completed in 45 minutes. The makers estimate that the trailer capacity for corn in the sheaf is 1 ton which can be dried down to stocking level in 15 minutes. The drier is operated by one man; it consumes about 12 gallons of crude oil per hour and is marketed (with 2 trailers) at £994.—*Fmr and Stk Breed.*, 12 Oct., 1948. —P.M.

New Sugar Beet Lifter 417

Information has recently been received of a new approach to sugar beet harvesting by a Danish farmer's beet lifting experiments, as a direct consequence of which a beet lifter of new design is now in production in East Anglia. Developed and patented by Mr. D. Guy of Forncett St. Peter, Norfolk, the new implement has already proved itself in the locality. It functions as a very simple and robust beet lifter and its further development towards a very cheap and effective harvester is under consideration. Like all innovations which have come to stay, the existing machine, known as the "Guyco" Sugar Beet Lifter, combines extreme simplicity with technical effectiveness and low cost. The beet lifter has no moving parts at all, apart from an optional depth control wheel, and is suitable for all kinds of root crops. Built on the sledge principle and costing about £40 including optional attachments to suit various kinds of land and conditions, it windrows two rows of beet into one. Demonstrations held at Fakenham and elsewhere have shown how efficient the lifter really is, fully lifting two rows of beet and laying them down into a single line.

From the farmers viewpoint the new lifter has an important advantage, since it avoids disturbing the subsoil, beet being squeezed out of the soil firmly but gently. The surfaces in contact with the soil are cast-iron runners or sweeps, which act by means of a gradual squeezing action, and can be replaced quite cheaply if they eventually wear out. In this connection a complete spares service is available for immediate replacement in case of damage or wear.

If it is possible to develop the machine so that it can also top the beet, then a new and simple approach to an inexpensive root harvester will have been made. This, in fact, is now under development.—P.M.

Finland

Institute of Agricultural Engineering 418

At the end of 1946 a new Institute of Agricultural Engineering was founded in Finland, to be established at one of the University farms in the vicinity of Helsinki. According to its programme of work, not only will the machine trials formerly conducted be continued, but research in agricultural engineering will take place with a view to encouraging the Finnish agricultural machine industry. The Institute will have an important part to play in the mechanization of agriculture in Finland. A. S. Reinikainen. *Maatalous ja koetoiminta*. 1948.—O.V.

Agricultural Recovery 419

To regain and maintain the 1939 relationship between population and cultivated land, it would be necessary to clear 709,000 acres, to account for territory ceded as a consequence of the war; an additional 304,000 acres for the population increase since 1939 and about 86,000 acres annually for as long as the present population growth is maintained. In northern Finland, about 2,965,000 acres of land are suitable for clearing, with modern technical improvements; a further 1,730,000 acres are suitable for clearing in central and southern Finland. With the aid of loans and benefit payments from the government, private and public efforts are joined for the expansion of the cultivated area. Recovery of the cultivated area is however putting a severe strain on the available labour, the industrial capacity and the taxpayers. Recovery of yields of crops is the other great problem to be solved. During the war, applications of lime and fertilizers was sharply curtailed and yields declined generally. Given a fair chance to solve its economic problems, the prospects are good for recovery and further growth of the country's agriculture. *Foreign Agric.*, June, 1948.—P.M.

Netherlands

Wageningen, Centre of Agricultural Research 420

Under this title an illustrated brochure has been published (1948) which furnishes for the English reader a valuable guide to the organization of the great Netherlands centre of agricultural education and research. From the Agricultural University, an instructional body comprising a large number of different institutes or departments and laboratories, the various autonomous, official and semi-official institutes such as the Government Seed Testing Station, the Central Institute of Agricultural Research, the Government Institute for Research on Varieties of Field Crops (developed out of the University's Institute for Plant Breeding), and the organizations which inspect, certify and register the seed of crop varieties, have evolved. The functions and personnel of these institutes and organizations are listed and an account is given of the co-operation between them.—G.M.R.

Soil Blowing 421

Soil blowing is at times the cause of serious damage to crops in certain parts of the Netherlands. Unusually dense dust storms took place, for example, in the winter of 1947, and regularly recurring spring soil blowing is reported for the Groningen Peatland Settlements. Enquiries as to the extent and nature of the damage are being made by means of questionnaires. The Agricultural Information Service devotes the whole of the November issue of its official organ the *Maandblad*, to articles discussing the problem and means of control. A list of recent literature on the subject is included. *Maandbl. LandbVoorlDnst* November, 1948.—G.M.R.

France

Oil Crops 422

Monsieur Henri Hitier, at the meeting of the French Academy of Agriculture of 7.4.48 asks why it is now being found possible to cultivate again certain crops previously abandoned, particularly oil crops. While recognizing the part played by guaranteed prices, he attributes the change chiefly to the mechanization and reduction of labour involved in cultivation. Taking colza as an example, he analyses the time taken by the hand and mechanized processes both for cultivation and pest control. *C. R. Acad. Agric. France* April, 1948.—D.B.

U.S.S.R.

Branching wheat 423

According to the Russian journal "*Bokpyr Cbema*" Ukrainian plant breeders have succeeded in breeding a wheat variety with a stem which branches and thus produces more ears.

In 1947 the new wheat was sown only on a few experimental plots, but in 1948 it was being sown on large areas in different agricultural regions. To determine the best method of growing this new variety, sowing has been carried out at different dates and with varying distances between the drills. *Jordbruk. FörenBl.* 10 July, 1948.—R.P.J.

Drought and Soil Erosion 424

A programme to protect the rich agricultural areas of the Soviet Union from drought and soil erosion is to be completed during the next 15 years. The scheme involves planting a forest belt 3000 miles long in four strips which will protect European Russia from the dry winds from the Caspian area and Central Asia. Local windbreaks on collective farms are to cover 300,000,000 acres, and thousands of reservoirs on collective and State farms are to conserve water for irrigation and for hydro-electric power. Collective farms are to use an improved grass and crop rotation system. Apart from relieving the drought problem in fertile regions it is assumed that the measures will result in more than 100 per cent increase in the average yearly grain yield. *The Manchester Guardian* 25 Oct. 1948.—M.H.

Portugal

Exchange of Seeds 425

The Estação Agronómica Nacional at Sacavém, Portugal, offers in exchange seeds which include a large number of varieties of *Triticum compactum*, *T. durum*, *T. pyramidale*, *T. spelta*, *T. turgidum*, *T. vulgare*, *Avena byzantina*, *A. sativa* spp. *genuina*, *grandiglumis*, *nodipilosa*, and *praegravis*, *A. strigosa* spp. *glabrescens*, *Hordeum distichum*, *H. hexastichum*, *H. tetrastichum*, *Oryza sativa* spp. *indica* and *japonica*, *Glycine soja*, and *Linum usitatissimum*. The varieties are enumerated in a list published by the Sacavém Station, with notes on the country of origin, and particulars, if desired, may be obtained from the Commonwealth Bureau of Pastures and Field Crops.—G.M.R.

Spain

Agricultural Production 426

From two volumes on "The National Income in Spain" published by the Council of National Economy, data of agricultural production are reported : this reached a minimum in 1945 when it was only 52.10 per cent of that of 1929 (this very low figure is partly attributed to unfavourable climatic conditions) ; in 1946 it reached 78.60 per cent ; this figure shows a certain improvement in comparison with the production of the years after the revolution. *Surco* Vol. 7. No. 73. 1948.—E.B.

Angola

Agricultural Service 427

The organization and work of this Service is outlined by Eng. I Barbosa in *Agros* for March-April, 1948. Six regional stations, three in the north of the colony, three in the south, conduct various types of experimental work. The Angola Plant Breeding Station near Nova Lisboa is engaged in the breeding and trial of cereals and forage plants, and at a substation near Benguela even better conditions for breeding are found, two to three crops being obtainable annually. Agricultural machinery is tested and operators are trained at the Malange Station, which also studies several tropical crops including *Manihot utilissima*, *Oryza sativa* and *Zea mays*. Cotton research is carried out at the Catete Station, 60 km. south of Luanda. Educational and informative work is organized under five regional commissions collaborating with the regional Stations, and much additional experiment work is done on private estates and elsewhere. Attention is being paid to methods of soil conservation.—G.M.R.

Australia

High Grain Sorghum Yields 428

Remarkable yields have been recorded in the 1947-48 grain sorghum variety trials at the Yanco experimental farm, Murrumbidgee Irrigation area, New South Wales, and in the Tumut district of southern New South Wales. Grain sorghum was practically unknown in Australia a few years ago. Caprock, a variety introduced from the U.S.A. during 1946, returned a yield of 111.8 bu. to the acre, Plainsman 101.9 bu., Wheatland Milo 94, Westland 82.8, Martin 82.2 and Kalo 81.5 bu. Another variety, Hegari, which germinated poorly, yielded 33.4 bu. to the acre. Figures from the United States show that the average sorghum yield during the years 1934-43 was 13.7 bu. to the acre, 19.9 bu. in 1944 and 15.1 bu. in 1945. The highest yields were California with 34.6 bu., and North Carolina with 30 bu.

Although the Yanco trials were carried out under controlled conditions and with irrigation, agriculturists believe that the normal average yield under field conditions in large areas like the 250,000 acres of Central Queensland, chosen for the British Food Mission farm project, will be 30 bu. to the acre, a considerable advance on the United States average. *Australian Rural Reference Newsletter.* August 9, 1948.—G.M.H.

New Zealand

Wheat Review, 1947 429

This review is the third issue of the series, which records seasonal information and some articles on the main problems and developments in the wheat, flour and bread industries. The following bibliographical details indicate the type of contents :

Flay, A. H. Can New Zealand grow her wheat requirements ?
Frankel, O. H. Which grows " extra wheat "—the light or the heavy land ?
Hullett, E. W. Baking quality of 80 per cent extraction flour.
Hullett, E. W. Is New Zealand wheat now better than Australian ?
McPherson, R. Wheat and flour marketing in New Zealand.
Frankel, O. H. W.R.I.-Yielder—a new high-yielding wheat.
Frankel, O. H. and Hullett, E. W. Hilgendorf—a new wheat of outstanding baking quality.
World wheat production
Palmer, T. P. Disease resistant wheats.
Frankel, O. H. Survey of wheat-growing districts.—M.H.

Canada

New Publication 430

Agricultural research workers will welcome the appearance of " Who's who in the Agricultural Institute of Canada." The book is published by the Institute at its Central Office, Ottawa, and is priced at $2.50. This valuable reference book should be in the libraries of all agricultural institutes.—P.M.

Soybean Diseases 431

There are about 30 known parasitic diseases of soybeans, fourteen of which have been found in the soybean producing areas of south-western Ontario. Seed treatment is recommended as a control measure against the seed-borne diseases and farmers are being encouraged to treat even healthy seed.—*Soybean Digest* Aug. 1948.—P.M.

U.S.A.

Soybean Research 432

For those interested in research bearing directly on soybeans and soy products, the *Soybean Digest* Vol. 8. No. 7. publishes a list of active research projects. The list does not include the plant breeding and disease work of the U.S. Regional Soybean Laboratory, except where listed as state projects, the industrial research of the Northern Regional Research Laboratory, nor research carried on by private agencies.—P.M.

New Use of Buckwheat 433

The United States Agricultural Research Administration has announced that green buckwheat has been found to be a source of a recently discovered important drug called rutin. The drug, used in the treatment of hæmorrhage diseases, is being made in the United States by 15 manufacturers from buckwheat leaf meal for the production of which six processors are drying buckwheat. The 1948 crop for this purpose, is estimated to be 50 thousand acres, representing a cash income of $2 million to the farmers.—*Fm News*, 25 Aug., 1948.—P.M.

Uruguay

Locust Control 434

Dense clouds of locusts invaded the coastal and northern Departments of Uruguay in May, 1947, subsequently spreading to the rest of the country. In a pamphlet published by the Uruguayan Ministry of Animal Husbandry and Agriculture, Engineer *J. Murguia* gives an account of the five months' activities of the Department charged with locust control, of which he became Director two months after the invasion had started. In spite of the start gained by the locusts and a general shortage of machinery and dusts, equipment was collected, partly with help from Argentina, regional centres of observation and attack were organized, aerial work was carried out with the aid of the Uruguayan Air Force, some 6434 tons of locusts were destroyed, and in addition to the valuable practical experience gained a certain amount of experimental work was done, all of which is summarized as a basis for deciding optimal methods of future control. *Uruguay, Min. Ganad. Agric., Dir. Agron.* Publ. No. 92 1948.—G.M.R.

Venezuela

Cereals and Pulse in 1947 **435**

Maize is the most important cereal for the Venezuelan dietary, but production in 1947, 231,307 tons, was insufficient for the country's needs, 4.1 per cent less than the production of 1945 and 32.6 per cent less than that recorded for 1937. Rice is second in importance to maize and excellent conditions exist for this culture, but production in 1947, 26,180 tons, left a deficit of 33,000 tons still to be covered, in part by imports. Wheat consumption is estimated at 138,500 tons annually, of which only 5495 tons were grown in Venezuela in 1947. Pulses (black beans, kidney beans, peas) are an important food, but production is some 17,000 tons behind present requirements, a fact partly due to archaic methods of cultivation. Efforts are being made by the Ministry of Agriculture in conjunction with the Venezuelan Agricultural Bank, which furnishes credits, to put the crop production of the country on a sounder basis. *Agricultor venezolano* Jan.-March 1948.—G.M.R.

Argentina

Botanical Congress **436**

The Second South American Botanical Congress was held in Argentina from October 10th to 16th, 1948. Some 250 delegates from South and Central America and the United States attended, and representatives from France, the Netherlands and Sweden were also present. The First Congress was held in Brazil in 1938.—G.M.R.

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FIELD CROP ABSTRACTS

LAND UTILIZATION AND MANAGEMENT

FINLAND, Forest Research Institute Comm. 36.2. Suomen aitarakenteet. [**Fences in Finland.**] By *A. Jäntti*. 1948. pp. 42. [English summary, pp. 41-2] **437**

Results published in 1945, of an investigation by the Forest Research Institute in collaboration with the Finnish Grassland Society with regard to the amount of wood and wire contained in fences, their length, and the total length pulled down and rebuilt in 1938.

The investigation covers 14 different types of fences in the 6 districts of Finland. Results are in percentage figures and million metres for the districts and for farms belonging to different size groups according to their areas of cultivated land. Statistics of length of the different fences in the various districts are given. Tables show the quantities of wood used for different districts.

The quantity of wood in fences per cattle unit varied in different parts of the country as follows:—

District.	Solid cbm. of wood in fences per cattle unit
P-maa	4
Sa-Va	4
Hä-Uu	5
Sisä-S	15
Kaak-S	10
Pohj-S	8
Average for whole country	8

Averages of wood per cattle unit on farms varying from less than 10 ha. to over 25 ha. are given. The quantity of wire used in 1938 was estimated at 55 mill. kg. The amount of wood released in pulling down fences, equal to the quantity used for the construction of new fences, in that year, was 1,000,000 solid cbm., 90 per cent of which belonged to 2 types of split-rail fences.

A record of working hours required for the construction of different fences is included.—From English summary.

WEST MIDLAND GROUP ON POST-WAR RECONSTRUCTION AND PLANNING. **Conurbation.** A planning survey of Birmingham and the Black Country by the West Midland Group. 30 × 22. pp. 292. London: The Architectural Press, 9-13 Queen Anne's Gate, S.W.1. 1948. 30s. **438**

This publication is of direct interest to agricultural land planners not only because of the high standard of presentation of all the relevant data in book form, but also in so far as the utilization of agricultural land within and around a densely populated industrial area is concerned. "The complex of towns, boroughs, urban spores, submerged villages and open land which make up a conurbation is no easy field for study." In addition to reviewing the possibilities of agriculture and horticulture in an area where industrial deposits and smoke pollution present serious difficulties, the survey has concerned itself with the reclamation of the unsightly mounds in coal-mining areas such as the South Staffordshire and Cannock Chase coalfields. "The Group is of the opinion that by the reclamation of waste land, by the preservation of unspoiled land, and by the restoration of misused land, the Conurbation could become a more attractive and more efficient place."

The true agricultural background from which this industrial area receives much of its farm produce is described in another survey by the same group, "English County" (*Fld Crop Abstr.* 1. Abst. 638.)—R. O. Whyte.

MINISTRY OF HEALTH. Report of the Gathering Grounds Sub-Committee of the Central Advisory Water Committee. **Gathering Grounds. Public Access to Gathering Grounds. Afforestation and Agriculture on Gathering Grounds** 1948. pp. 33. **439**

The Committee investigated the desirability of permitting afforestation and agriculture on the gathering grounds of upland reservoirs where adequate purification processes exist. They recommend that, subject to safeguards, the land should be put to the utmost agricultural use (and existing production increased on some areas); and that land incapable of agricultural use should be afforested for timber where possible and having regard to the needs of adjacent agriculture. Water undertakers who own or control gathering grounds are advised to consider the provision of capital for the large scale farming units probably involved. Human sewage must be disposed of satisfactorily; human pollution is a source of water-borne diseases, whilst animals and their manure do not constitute a direct danger to health through occasional pollution. Animals should however be kept from reservoirs and feeder streams and drainage for farm yards and meadows should be excluded. The use of fertilizers is subject to the same considerations. Some recommendations regarding afforestation are given.—K.J.S.

EDELMAN, C. H. Landclassificatie. [**Land classification.**] *Landbouwk. Tijdschr.* **60.** 564-71. 1948. [Foundation for Soil Mapping, Dept. Reg. Soil Sci., Agric. Coll. Wageningen] **440**

The author presents an exposition of the five different types of land classification which are outlined by the United States National Resources Planning Board in its publication " Land classification in the United States," 1941, pp. 3-9, and shows how far such classification has already been done in the Netherlands, or, in some cases, might be done.—G.M.R.

AGER. Notas sobre riegos [**Notes on irrigation.**] *Ager, Madrid* **4.** 150-1. 1948. **441**

General information and advice on irrigation is given in relation to nature of the plants, quality of the soil and climatic factors.—E.B.

GONZALEZ, T. B. Implantación de nuevos regadíos. [**Establishment of new irrigated lands.**] *Ager, Madrid* **4.** 111-3. 1948. **442**

An article of discussions among farmers of the principles to be followed in establishing new irrigations.—E.B.

GONZALEZ, T. B. Los nuevos regadios extremeños. [**New irrigated lands in Estremadura.**] *Ager, Madrid* **4.** 73-4. 1948. **443**

The hydraulic works of the Guadiana river that will allow irrigation of about 100,000 ha. of land, have been of late accelerated. An account of these works, which will regulate the course of the river and utilize its water both for irrigation and production of electric power, is given.—E.B.

GRILLOT, G. Mission d'étude des sols du futur périmètre irrigable des Srarhna. [**Mission to study the soils of the future irrigable perimeter of Srarhna**] [Contained in] Étude preliminaire des sols du périmètre irrigable des Srarhna. Maroc, Direction Agric. Comm. et Forêts. pp. 31-40. 1948. [Service de la Recherche agronomique et de l'Expérimentation agricole] **444**

The region under study, situated north-east of Marrakesh, has an area of 50,000 ha., and is a part of the Sahira basin, some zones of which are already irrigated by the natives. The possibility of its cultivation is dependent on irrigation. It is a plain with no natural outlet of waters ; they collect in the lower part and dry up during the dry season, which lasts from May until November. Drainage and clearing of the excess of salts must first be considered. Possibilities of irrigation are examined in relation to soil constitution. The land should be kept partly under trees and partly under crops. For the formation of artificial meadows in rotation, lucerne is suggested in consideration of its resistance to salty conditions.—E.B.

VIGUIER, P. Situation des terres irriguées de l'Office du Niger. [**Condition of the irrigated lands of the Office of the Niger.**] *Rev. Bot. appl.* **27.** 460-70. 1947. **445**

The Office of the Niger, which started its works over 20 years ago, is at present in suspension, activity being directed only towards the improvement of the existing irrigation plants. It is admitted that results achieved are inferior to what could reasonably have been expected. Blame is put on the native peasants, who are slow in adopting the new cultural methods. The programme includes mechanization, establishment of a rotation in rice and cotton cultivation by the introduction of fallow-land and crops for green manuring respectively, weed control mainly in the rice fields which are invaded by *Oryza Barthii* and *Brachiaria* sp., etc. Present main object is to raise yields which average 6-7 quintals per hectare of grain-cotton and 14-16 of paddy.—E.B.

LOECKX, M. A. Erosiebestrijding in het Gewest Mahagi. [**Erosion control in the Mahagi Territory.**] *Bull. agric. Congo belge* **39.** 511-30. [French summary, pp. 528-30.] 1948. **446**

In the region under study overpopulation and overgrazing are causes of soil deterioration and erosion. Trials were started by the author in 1945-46 in order to bring improvements to the agricultural situation, but it is early to give conclusive results. For the present it can be said that the following species sown on fallow land infested by *Digitaria scalarum* have developed well : *Tephrosia* sp., *Cassia laevigata*, *Cassia didimobotrya*, *Erythrina abyssinica*. Cuttings from several savanna trees have proved unsuccessful. For hedge formation in soil fixation, *Pennisetum purpureum*, *Coleus barbatus* and *Andropogon muricatus* are recommended. *Agave sisalana* is advisable only for the Lake Albert plains. Strip cultivation, well received by the natives, is effective for soil retention. *Acacia decurrens* and *Ficus* have given good results as fire-screens. A trial of controlled grazing has been carried out over 569 hectares : the lots of pasture were separated by wind-screens or hedges of *Caesalpinia sepiaria*, *Agave*, *Cassia* sp., *Carissa edulis*. *Caesalpinia sepiaria* has proved to be the best for hedges.—E.B.

WEBB, H. W. T. **Storm drains, gully control and soil holding vegetation in soil conservation practice.** *Nyasaland Agric. Quart. J.* **7.** 44-55. 1948. **447**

Conditions and circumstances relevant to storm drains, and their construction are discussed, and methods of gully control by prevention, stabilization of existing gullies, and reclamation, are presented. The importance of the use of local soil holding vegetation under local conditions is stressed.—J.T.B.

THE COMMONWEALTH ENGINEER. **Aerial mapping aids study of engineering projects.** *Commonw. Engr* **35.** 23-8. 1947. **448**

Modern methods of aerial surveying being applied in Australia to assist in the design and construction of a variety of engineering projects are illustrated in this report by a map of Victoria showing the 30,000 square miles of land photographed. The advantages of aerial mapping are described and a brief review of applications given. In addition to aiding the enlargement of the Eildon Reservoir and the compilation of a photomap of Melbourne—showing every building, fence, and tree in the area (maps are given of both these projects), extensive use is made of aerial photographs by the State Rivers and Water Supply Commission in its survey and investigational work. These include: (a) Calculation of reservoir capacity from contoured maps prepared from aerial photographs. (b) Drainage. (c) Flood determination. (d) Preliminary channel location. (e) Location of dam sites. (f) Geological investigations of dam sites. (g) Vegetation studies—determining quantities and types of vegetation in catchment areas and in areas submerged by new reservoirs. (h) Soil erosion, as an aid to determining its extent and type within a catchment area. (i) Maps for the illustration of reports.

The report concludes with descriptions of the methods of photography used.—K.O.

DODGE, D. A., and JONES, H. E. **The effect of long-time fertility treatments on the nitrogen and carbon content of a prairie soil.** *J. Amer. Soc. Agron.* **40.** 690-7. 1948. [Kansas Agric. Exp. Sta.] **449**

Nitrogen and carbon data are recorded for the top 6.33 inches of prairie soil in the 30-year fertility experiment at Manhattan. Plots include a 16-year rotation (4 years in lucerne, followed by a maize/maize/wheat rotation for 12 years); a 3-year rotation of maize/cowpeas/wheat/continuous wheat. P, P + K and P + K + N treatments were applied. Resulting curves show a continuous overall loss of nitrogen and carbon over the entire period (1915-1946) irrespective of cropping system or fertilizer treatment. Fertilizer dressings did not maintain N status or affect N : C ratios in soil. Nitrogen loss was essentially the same from the two rotations and practically reached equilibrium under continuous wheat. Carbon loss was greater under a 3-year rotation and continuous wheat than under a 16-year rotation. Yields were highest from the rotation including lucerne and with complete fertilizer but C and N levels in soil were scarcely influenced.—K.J.S.

BEARD, C. N. **Land forms and land use east of Monterey Bay.** *Econ. Geog.* **24.** 286-95. 1948. [Fresno Sta. Coll. Fresno, California] **450**

Eight major groups of land forms may be recognised, together with their respective types of soils, in the district east of Monterey Bay.

Apples are by far the main fruit crop on this eastern shore of Monterey Bay, while various berries, vegetables, and field crops such as sugar beet, hay, and dry beans, are also important products. Dairy farming and livestock production are common in the entire area. Crop correlations according to land forms in the area are considered. Future utilization of the land will probably be greatly affected by the frozen food industry, which is relatively important in the Monterey Bay region.—J.T.B.

WAIBEL, L. **Vegetation and land use in the Planalto Central of Brazil.** *Geogr. Rev.* **38.** 529-54. 1948. [Conselho Nacional de Geografía, Rio de Janeiro] **451**

The area studied comprises the south of the State of Goias and the central and western part of the State of Minas Gerais, and includes the region of the proposed new federal capital. An ecological discussion of the forest and open country composing the region is presented. The vegetation is composed of approximately 75 per cent of *campo cerrado* or broadleaf scrub. Any crop cultivation which takes place is done in cleared forest (sugar cane for cattle feed or alcohol, rice, corn and beans), although probably 20 to 30 times more forest is cleared and burned to graze stock than to grow crops. Shifting cultivation is at present common. The best soil is found in the forests and that of the natural grasslands is poorer, a condition true of other tropical regions as well. There is no proof, however, that the broadleaf scrub, at present avoided, is uncultivable, and the author foresees that eventually the less exacting crop plants such as manioc, cotton and pineapples will be cultivated on *campo cerrado* lands. To achieve this, it will be necessary to replace hoe culture by plough culture, rotation of land by rotation of crops, and shifting cultivation by permanent cultivation.—G.M.R.

BOERGER, A. La desmineralización de los continentes. Creciente desequilibrio productivo y nutritivo. [**The demineralization of the continents. Increasing productive and nutritive disequilibrium.**] *An. Soc. cient. argent.* 145. 281-306. 1948. [Director, Inst. Fitotéc. Sem. Nac. La Estanzuela, Dept. Colonia, Uruguay] **452**

In an address presented to the Argentine Scientific Society, the author discusses equilibrium as a principle of stability in Nature, demineralization as an ordinary geological process, and accelerated demineralization under the utilitarian action of man. A large number of illustrations are given and, in connexion with the third point, some alarming figures recently determined for South America.

One example is taken from Uruguay, where for 80 per cent of the soils it is calculated that under continuous cropping the phosphorus content of the uppermost 25 cm. will be exhausted in 195 years. Another example is the determination of a 53, 77 and 93 per cent reduction in the phosphorus, potassium and calcium content respectively of the uppermost 30 cm. of a fertile Brazilian soil after 22 years only of continuous coffee growing. The author then discusses the effects on plants and animals of mineral deficiencies, examples of which are all too plentiful, and describes the alarming progress of demineralization during the present century, in which the increasing mechanization of agriculture constitutes a serious menace, especially in the new countries. In seeking remedies both aspects of the disequilibrium, the productive and the nutritive, must be considered. An outline is given of measures, palliative, remedial and preventive, which are being taken in Uruguay. The use of synthetic fertilizers, hitherto considered impracticable in the sparsely populated new countries, is becoming of immediate importance in some areas. Man will continue to depend on crop and animal husbandry. Synthetic products are no ultimate solution, since almost all depend on substances derived from the photosynthetic activity of plants. Is oceanic photosynthesis, demonstrated to be three times as effective as that of the earth, to be a future solution of the problem? For the present attention is drawn to Sir E. J. Russell: "Phosphate supplies may yet become the factor that will determine the course of history" (Soil conditions and plant growth. 1932. p. 554).—G.M.R.

FARMING SYSTEMS

FUSSELL, G. E. **"High farming" in the north of England 1840-1880.** *Econ. Geog.* **24.** 296-310. 1948. **453**

The improved farming systems of Northumberland were the cynosure of agricultural eyes during the years 1840-1880. This condition had been achieved largely by the extended use of the Leicester Cross in sheep, by the increased use of cake-feeding and the new artificial manures, by drainage, and by the use of steam tractor cultivation.

In the county of Durham a famous breed of cattle had been developed and was maintained during the four decades, but arable farming and sheep stock were little improved. Better types of cattle and sheep were widely dispersed through Cumberland, and new farm implements and the use of lime and artificial fertilizers were responsible for farming improvements in this county. Improvements along the same lines also took place in Westmorland, Yorkshire and Lancashire, but at a slower rate. It is maintained that the great landlords of these forty years were largely responsible for many of the improvements in these counties.—J.T.B.

KINSEY, C. **Pioneer cropping in the Herefordshire uplands.** *N.A.A.S. Quart. Rev.* No. 2. 96-8. 1948. [Dep. County Agric. Officer, Herefordshire, West. Mid. Prov.] **454**

The report is based on experience with pioneer cropping of some 1000 acres in the Herefordshire uplands.

After bush clearing an effective kill of bracken (by burying) is achieved when ploughing is in the May/June period. One way ploughing with 2 or 3 furrow semi-digger ploughs or prairie busters, followed by cultivations to secure a fine but well consolidated seed-bed are essential. Manurial requirements vary, but heavily infested bracken lands usually have a high potash content. Dressings of 3 tons ground limestone, 8 cwt. basic slag and 1.5-2 cwt. nitrogenous manure per acre are usual.

Pioneer crop mixtures used are: 1 lb. turnips, 5 lb. rape and 2-3 lb. thousand-headed kale per acre where the soil is not too shallow, or, on poorer soils, the kale is substituted by 15 lb. Italian ryegrass per acre. The mixtures should keep 100 fattening tegs for two weeks on a good pioneer crop, but much information is still required on the value of different seed mixtures.

If a good pioneer crop is obtained the long ley mixture may be sown in June or July, or where fertility is low, a second pioneer crop may be sown. Necessary tilth is obtained by repeated disking and other cultivations; a second ploughing is inadvisable.—K.O.

PELAYO, C. del P. Alternativa de cosechas. [**Rotation of crops.**] *Surco* **7.** 5-8. 1948. **455**

The advantages of crop rotation are explained. On dry farming, the following rotation is advised: fallow/wheat/leguminous plant/barley; the leguminous plant can be chosen from: carob bean, vetch, *Lathyrus sativus*, chick-pea (*Cicer arietinum*) and pea (*Pisum sativum*). On irrigated farming lucerne is a basic plant and lasts at least 5 years, but it is advisable that it should leave the soil free for about double this time. A suggested 15-year rotation is: lucerne (5 years)/early potato/wheat/sugar beet/oats followed by *Phaseolus vulgaris*/*Cucumis melo*/sugar beet/wheat/vetch for forage followed by late potato, bean, or sugar beet. A diagram illustrating this rotation gives sowing and harvesting dates which are applicable in the central regions of Spain. Several summer and winter-fallow periods take place during which the working of the soil can be done. The author points out that on irrigated land it is uneconomic to leave the soil fallow for a whole year.—E.B.

THE COUNTRYMAN. **Experiments with rotations.** *The Countryman* **2.** 6-8. 1948. [Cyprus Dept. Agric., Nicosia] **456**

Rotation experiments at the Central Experimental Farm, Morphou, have shown that the inclusion of harvested legumes only pays on good soils which obtain high yields. The quantity of fertilizer necessary to maintain wheat yields in a wheat/seed legume, or hay rotation at the same level as obtained without fertilizer in a wheat/fallow rotation, is 210 lb. per acre of superphosphate and 84 lb. per acre of $(NH_4)_2SO_4$. The new wheat/grazing crop rotation as compared with fallow, markedly improves the yield of wheat. See also *Fld Crop Abstr.* 1. Abst. 1215.—K.O.

DRACHOUSSOFF, V. Essai sur l'agriculture indigène au Bas-Congo. [**Essay on native agriculture in the Lower Congo.**] *Bull. agric. Congo belge* **38.** 471-582. and 783-880. 1947. **457**

This work reports the conclusions of a Mission in the Lower Congo, which started with the object of surveying three characteristic native districts of the Cataracts Territory (province of Leopoldville) under physical, agronomic, economic and human aspects. The object of this study (which was carried out only for the Bangu and Inkisi districts) was to supply information on the possibilities of soil improvement, of agricultural development, and on prevention of soil erosion.

The Cataracts Territory situated south of the equatorial forest, is included in the savannah zone but shows a clear forestal vegetation. The effect on the soil of two usual practices, fallow-land and fire, is examined. The practice of burning, which prevents the savannah turning to forest, is necessary to a certain extent, but must be limited and controlled.

The real position of the region is arrived at from the relation: food requirement/agricultural possibilities. For the different crops grown in the region, tables are given; these include varieties under their vernacular names, their characteristics and cultural methods. Among the plants considered are: *Manihot utilissima*, *M. Aipi*, *Dioscorea*, banana-tree, *Colocasia*, pumpkin, sweet potato, groundnut, bean, sesame, maize. These plants are grown in rotation and generally intercropped. According to the soils, they cover a period from 1 to 2·5 years (in this case there are two normal crops separated by a catch crop). There follows a period of fallow which lasts from 3 to 9 years, during which the soil fertility is only partly restored, then a period of crops and so on. When soil fertility is too low, a rest of 20-30 years is given, during which secondary forest may develop. —E.B.

CROPS AND CROP PRODUCTION

HIRVENSALO, U. E. Mosskulturföreningens försöksresultat ar 1946. 1. Leteensuo försöksstation. [**Results of experiments conducted by the Finnish Society for the cultivation of Peat-land. 1. Leteensuo Experiment Station.**] *Finska MosskFören Årsb.* **51.** 25-7. 1947. **458**

1. In a variety trial with oats on sphagnum peat soil, in which most of the varieties were tested for the first time, promising results were given by Fennia X Kytö, a 6933, and Minor, as under:

Variety	*1000 grain wt. (grm.)*	*Yield (kg. per ha.)*	
		Grain	*Straw*
Minor	31.35	1305	2870
Fennia X Kytö	29.75	1245	2365
a 6933	30.00	1065	2620

In a variety trial with spring wheat on fen peat soil the following results were obtained:

Variety	*1000 grain wt. (grm.)*	*Yield (kg. per ha.)*	
		Grain	*Straw*
Diamant II	38.25	3175	4895
Pika II	32.25	3090	5340
a 752	31.75	3040	4995
Tammi	33.25	2800	4420

A variety trial with autumn rye was sown on clay soil. All the varieties overwintered well; no lodging occurred. Yields were as follows:

Variety	*Yield (kg. per ha.)*	
	Grain	*Straw*
Onni	1665	3605
Toivo	1565	3485
Pekka	1515	3080
Ensi	1410	3385

A trial was conducted with different strains of sugar beet on clay soil. The area was manured with 35 tons farmyard manure, 1000 kg. superphosphate, 800 kg. 40 per cent potash salts and 400 kg. saltpetre all per ha. Sowing was carried out on 11 May. The Maribo strain proved best both as regards size of yield and form of the root.—R.P.J.

STENSTRÖM, J. Några ord om spannmåls-, ärt- och oljeväxtsorter för södra Finland. [**Notes on varieties of cereals, peas and oil plants for South Finland.**] *Tidskr. Lantm.* **30.** 74-5. 1948. **459**

Notes are given on the following cereal varieties:—rye: Oiva, Toivo, Pekka, Onni and Ensi; autumn wheat: Varma, Olympia, Virtus; spring wheat: Diamant, Diamant II, Kimmo; barley: Binder, Tammi, Vega, Maja and Balder; oats: Golden Rain II, Eho and Sol II.

Further short notes are included on Artturi (fodder pea), autumn "rybs" (*Brassica rapa* var. *oleifera*) and two fibre flax varieties, Vaanila and a numbered variety from Dickursby Research Institute.—R.P.J.

Oliva, A. Trattato di agricoltura generale. [**Treatise of general agriculture.**] 25 × 19. pp. 569. Milan: Azienda Editoriale Tecnica Artistica Scientifica Via Mantegna 6. 1948. 47s. 6d. **460**

In this treatise covering the agriculture of Italy, the author first reviews the evolution of agriculture from prehistoric times up to the present. He then describes the typical agricultural zones among which the following can be noted: the Alpine zone where, above the limit of the chestnut and beech forest, are the Alpine pastures; the irrigated zone of the Po plain, where rotation includes wheat, rice and artificial leys, and yields up to 100 qu. per ha. (40 of wheat and 60 of rice) are reached in the same year; the zone of the dry lucerne meadows and industrial crops on the right bank of the Po. Proceeding south in the peninsula where the influence of the Mediterranean climate is exerted, meadows diminish, arboreous plants predominate over the herbaceous ones, and wheat is the most important herbaceous crop. All along the peninsula a central zone is determined by the Appenines: in the north Appennines the cultivated land amounts to about 30 per cent, the rest is pasture (with cattle and sheep rearing) and woods; in central and south Appennines the cultivated land amounts to 44 per cent, woods decrease and sheep rearing is predominant. In the flat and hilly regions of Central Italy, where land is divided into small holdings, a mixed agriculture predominates with different types of rotation including industrial crops, wheat, bean, clover, lucerne, and *Onobrychis sativa*. The type of agriculture in which wheat is predominant and rotation is often discontinnous determines the so-called "zones with extensive wheat cultivation" and is found in the coastal part of Tuscany and of South Italy, in Sicily and Sardinia. In a fertile zone of Campania, hemp, horticultural crops and citrus plants are grown. In Sicily citrus plants and cotton are also grown.

In the second part of the work, under the title "Improvement and protection of the agricultural soil," the author deals with the origin, constitution and dynamics of the soil; initial improvement; correction of anomalous soils; plantations; large irrigation works (which are different in northern, central and southern Italy); small irrigation works (which complete the large works); creation of the farm; means of increasing fertility; irrigation water; working of the soil; manuring.

In the third part, under the title "Improvement and protection of the agricultural plants," the crops grown in Italy are considered; the principal are: wheat, maize, rice, sugar beet, bean, potato, hemp, cotton, lucerne, and *Trifolium pratense*. Of secondary importance are: barley and rye, tobacco and flax, and gramineous species for artificial meadows. The possibilities of improvement of the principal crops is examined. The importance of bean (used for animal and also for human consumption) is due to the fact that it is the only cleaning crop to precede wheat in the southern semi-arid regions. A chapter deals with the protection of the improved agricultural plants from climatic adversities. The position of agricultural plants in the rotation is then considered. Continuous and discontinuous rotations are distinguished. The latter are determined by a semi-arid climate or by excess of land compared with the needs of the inhabitants. In north and central Italy, during the last centuries, a gradual transformation from extensive to intensive agriculture has taken place. In the extensive agriculture the succession of crops is interrupted by a rest (of variable duration) during which the land is left to pasture or is kept fallow (in this case the soil is cultivated). Extensive agriculture remains on the mountains and in south Italy, where it is difficult to introduce the leguminous plants in rotation. Passage to a continuous rotation is in fact determined by the introduction of forage leguminous plants, often with the help of irrigation. Rotations followed in the different parts of the country and intercropping are described.

A chapter deals with the yields of the principal crops. Rice (in Italy grown at its extreme limit of cultivation) is the only Italian crop that is approaching the maximum theoretical yield.

In an appendix the aspects of Mediterranean agronomy are considered. The author is of the opinion that the solution to the problems of these semi-arid regions (rainfall varies from 200 to 500 mm.) cannot be sought with the agricultural systems of central European agriculture and neither by those of the "dry farming" as formulated by North American agronomists.

Improvement of crops adapted to the region and of the cultural systems (consisting in superficial regulations, particular workings of the soil and weed control) can give valuable results within the possibilities of the extensive cereal-pastoral system.—E. Biasutti.

Thomas, G. C. H. **Agricultural research in St. Vincent.** *Crown Colon.* **19.** 18-9. 1949. **461**

An account is given of the establishment and work of the new experimental station and farm on the Canadian Park Estate. Extending over some 384 acres, the Station has its own meteorological unit thus enabling the results of experiments to be interpreted in relation to accurate weather data. Investigations are conducted with the object of advising local farmers on how to secure the best results from their crops. The work touches upon practically every crop grown in St. Vincent, and includes work on cotton, arrowroot, various types of corn, peas, sweet potatoes, cabbages, coconut, yams and cassava.

Improvement of yield and quality of cotton forms a major part of the work at the new Station. Sea Island V135 has been crossed with Montserrat (MSI) with the object of producing a strain bearing the length and fine spinning qualities of V135 with the better ginning out-turn and hardier character of MSI.

In animal husbandry, emphasis is on dairy management and it is expected to complete the installation of a modern milking plant in the near future.

Soil erosion is a constant problem in the island and consequently conservation practices are being given a great deal of attention. Methods of strip cropping, bunch terracing and protecting drainage outlets are studied and demonstrated to local farmers.

Experiments in crop rotations aim at ascertaining the effects of land utilization on crop yields and on the maintenance of soil fertility.—P.M.

ECONOMICS OF CROP PRODUCTION

BARKER, A. S. **Supplies of some raw materials in British agriculture and their implications on soil fertility.** *J. Proc. agric. econ. Soc.* **7.** 218-35. 1947. **462**

The paper discusses the aspect that influences soil fertility, namely the supply of the chief soil nutrients, nitrogen, phosphate and potash. The estimated average yields of crops in the United Kingdom show that the yield of all corn crops and roots increased from pre-war to 1943, but in some cases a fall in yield occurred after that date. Before the war livestock production was responsible for the major part of the removals of soil nutrients, but temporary precedence passed to crops grown for human consumption during the war. At all times the feeding of home-grown crops to live stock was probably responsible for an annual rate of nutrient losses greater than those caused by removals from farms in crops and stock products combined. So long as relatively unlimited supplies of imported feeding-stuffs are available they may compensate for the nutrient losses incurred in the feeding of home-grown crops. The changes in the ratio of grassland area to cow equivalents during the war years revealed the increased rate of removal of nutrients from grassland, and confirmed the general opinion of technical agriculturists that too much phosphate was applied to arable land and too little to pasture in pre-war years.—T.G.J.

HODDER, H. G. **The agricultural outlook.** *Nat. Pro. Bk Rev.* No. 3. 1-7. 1948. **463**

The report is based on an informal survey carried out through certain of the Bank's branches. It lists the production of crops called for by the Government and concludes that the planned increase in wheat production will not be achieved. Unsuitability of many areas and the exhaustive effects of recent intensive cropping are the main reasons presented. On the whole, it is maintained that the increased crop production can only be attained by improved farm management. Only marginal land is likely to be brought under the plough for the first time, and this will no more than offset the decline caused by the resting of over-cropped land. The feeding-stuffs position is likely to remain acute, and little hope is held out of any marked increase in the production of linseed. In traditionally pastoral areas grass drying on a co-operative basis may provide the answer if farmers can be convinced of its high protein content. But nearness to the plant and correct timing have to be considered. Individual farmers are unlikely to involve themselves in heavy capital outlay that may only be justified in the short period.—T.G.J.

RAEBURN, J. E. **The food economy of the United Kingdom in relation to international balance-of-payment problems.** *J. Proc. agric. econ. Soc.* **8.** 20-47. 1948. **464**

The author attempts to relate home production, imports and consumption to the wider problem of international balance-of-payments. He stresses the difficulty of measuring the " dollar value " of our various agricultural products. The possibility of substituting home produce for imported and vice versa, effective demands for different qualities of produce, etc., are all variable factors and likely to have complex results.

It is shown that cereals and their products are derived almost exclusively from hard currency areas, while molasses, vegetables and oil seeds and their products are also obtained to some extent from those countries we are least able to pay.

It is estimated that immediately before the 1939-45 war this country secured food and feeding-stuffs with a starch equivalent of almost 20 million tons. The war time increase is considered to be in the region of 2 million tons, surprisingly small in view of the additional labour, machinery and fertilizers used. It has to be recognized that in planning increased production in the form of feeding-stuffs there must be, for optimum net returns, a sufficient supply of concentrates. The author suggests that increased imports of concentrates may lead to less intensive use of land and labour in feeding-stuffs production. The net result may be an effective total supply of feeding-stuffs and grazing little greater than that of pre-war years in spite of increased expenditure of foreign exchange for grain and oil seeds.

Due to the fact that pressure towards increased labour efficiency is greater than towards increased crop yields there may be a return to larger hay acreages and a possible decline of average yields of starch equivalent per acre under the main crops including hay. The reason lies in more intensive stocking of pasture during the war years the pasture acreage declined by 26 per cent, but grazing live stock by only 4 per cent. Attention to the mechanization of ensilage is emphasized, and the need for functional efficiency in feeding-stuffs production is considered paramount.—T.G.J.

NORTHERN IRELAND, Monthly Report of Ministry of Agriculture. **Financial results of Northern Ireland farming, 1946-47.** *Mon. Rep. Min. Agric. N. Ire.* **23.** 101-2. 1948. **465**

The results of some 266 farms are presented, showing a net profit per farm of £402 4s. 9d. and £7 3s. 3d. per acre. The average area per farm (adjusted acres) was 56 acres. The average receipt per acre from crops was £5 17s. 7d. compared with over £8 for live stock and over £6 for dairy produce. Total running costs amounted to £15 2s. 0d., of which feeding-stuffs accounted for £3 12s. 2d.—T.G.J.

CAMBRIDGE UNIVERSITY Department of Agriculture, Farm Economics Branch Rep. No. 31. **Changes in the economic organisation of agriculture.** pp. 40. 1948. **466**

The 390 farms in this investigation are drawn from ten types of farming areas and in each of these net returns in 1947 were lower than in the previous year. The disappointing returns in 1947 were mainly due to very low crop yields following an exceptionally severe winter, a late spring and an acute summer drought. Redeeming features were fine weather at harvest and good crops of clover seed which formed a vital source of income on many farms. Out of a total gross income per farm of £3887, wheat receipts amounted to £367, barley £567, sugar beet £517, potatoes £503 and other crops to £524. Feeding-stuffs increased slightly as an item of expense, as did the total of gross charges.

The area under wheat was 25.6 acres per farm in 1947 and the average yield was 14.1 cwt. (compared with 22.9 cwt. in 1946). The acreage of barley was 34.1 acres per farm and the yield was 15.5 cwt. compared with 18.7 cwt. in 1946. The yield of sugar beet on the average area of 10.6 acres was 8.5 tons compared with 10.6 tons in the previous year. Potato yields fell from 7.8 in 1946 to 6.5 tons in 1947. Lower yields were obtained from other crops such as oats, rye, beans, peas and fodder crops.—T.G.J.

WEST OF SCOTLAND College of Agriculture, Economics Department. Rep. No. 6. **Farm account averages from south-west Scotland 1946-47.** pp. 22. 1948. **467**

The report deals with 227 farms and covers four main types, dairy, cropping, hill sheep and dairy with hill flock farms. Detailed sub-grouping provides a mass of statistical information. Net profits for the four types were £905, £618, £495, and £505 per farm respectively. On the cropping farms the receipts from potatoes were £1075 per farm as compared with receipts from grain crops of £686. Of the land on these farms 10.7 per cent was devoted to potatoes compared with 34.8 per cent under corn crops. On the dairy farms crop sales and subsidies amounted to £411 per farm.—T.G.J.

LEEDS UNIVERSITY, Department of Agriculture, Economics Section. **The economic organisation of intensive milk producing farms.** By *W. H. Long* and *A. G. Jeffrey*. pp. 11. 1948. **468**

The farms studied are divided into "wholesale" and "producer-retailer" groups, and a comparison of cropping and yields reveals that the former group devoted more land to arable crops and, on the whole, obtained better yields than the second group. Purchased foods were the highest item of expense, and were greater on the producer-retailer farms than on the wholesale farms, partly due no doubt, to the generally lower yield of home grown goods. Corn provided the highest cash output from crops on both groups, but total crops amounted to only £90 per farm out of a total output of £1077 on the wholesale farms, and £67 out of a total output of £1548 on the producer-retailer farms.—T.G.J.

LEEDS UNIVERSITY, Department of Agriculture, Economics Section Fmr's Rep. No. 77. **Farm accounts for management purposes. A Yorkshire farm accountancy study 1946-47.** pp. 28. 1948. **469**

The study relates to nine distinct groups of farms in Yorkshire in 1946/47 and deals with receipts and expenses on these types and attempts a measure of efficiency. Details of economic organisation are given, together with yields and outputs per farm and per 100 acres. The "cash roots" group realised the highest profit, and it is notable that the allowance for unpaid labour was lowest in this group. A number of interesting comparisons such as output per unit of labour, rent expenses and valuation are presented, and the order of efficiency in different factors is tabulated. Apart from gross and net output per £100 labour, the "cash roots" group was placed first or second on all counts.—T.G.J.

MOLTESEN, P. A. **Some post-war problems for Danish agriculture.** *J. Proc. agri. econ. Soc.* **7.** 160-72. 1947. **470**

The position of Danish agriculture is discussed in relation to the agriculture of the other countries of Europe, and the effect of a permanently agricultural Germany is emphasized. The cessation of imported supplies of oil cake, feeding grain and fertilizers led to reductions in live stock and crop yields. Some 16 per cent of the total agricultural area is devoted to roots, but compared with pre-war, potatoes and sugar beet have become much more important than mangolds. The most important factors in the future of Danish agriculture as an exporting industry will be (1) a proper relation between the price of the marketable commodities and the costs of production; (2) availability of imported feeding-stuffs; and (3) markets for the Danish commodities. An estimate of 400,000 tons of grain and 600,000 tons of oilcake is given as the approximate imports necessary to obtain the greatest possible production of milk and bacon.—T.G.J.

MINDERHOUD, G. **War-time and post-war time experiences of agriculture in Holland.** *J. Proc. agri. econ. Soc.* 7. 173-81. 1948. **471**

The immediate effect of the German occupation of Holland in 1940 was not harmful to Dutch agriculture. The main implications were an increase in the arable acreage and the selling of the surplus production to Germany instead of the United Kingdom. But the later reductions in pigs and poultry meant a loss of their chief source of income to the smallholders. It was only in the later months of the occupation that the greatest damage was done, when all that could be taken from the farms was removed and a large area of land flooded. The shortages of fodder and artificial manures aggravated the position to such an extent that the agricultural production in 1945 amounted to no more than 50 per cent of pre-war production. Shortages of currency and the world shortage of grain necessitate the export of the bacon and eggs production despite the fact that the dietary of the home population suffers in consequence.—T.G.J.

NETHERLANDS, Ministry of Agriculture, Fisheries and Food. **Dutch agriculture. Facts.** 1948. pp. 136. col. pls. incl. map. **472**

A large amount of valuable statistical information, with ample explanatory text in English, illustrations, charts and maps, is supplied in this booklet. Some items which may be mentioned are the control of seed quality, p. 14; the acquisition of new land, pp. 20-24; research and information services, pp. 33-38; production of agricultural crops, pp. 46-59; grass drying, p. 71. An interesting feature is the regional description of Dutch agriculture, p. 91 *et seq*, which shows at a glance the ratio of arable to grassland for each region and the areas devoted to the different crops.—G.M.R.

BAPTIST, G., and VERKINDEREN, A. Opzoekingen aangaande de rendabiliteit van de landbouw. Boekjaar 1947-1948, 161 bedrijven. [**Studies on the profitability of agriculture 1947-1948, 161 farms.**] *Med. LandbHogesch. Gent* **13.** 347-402. [French and English summaries, pp. 401-2.] 1948. [Govt. Station for Agric. Econ., Agric. Coll., Ghent, Belgium] **473**

A study of costing on 161 farms in the polder and loam regions and the sand-loam and loam regions of Belgium contains a large amount of statistical information. Of the area studied, 62.39 per cent was arable land, 29.72 per cent grassland. Results were on the whole satisfactory, the loam region being the only one in which some farms worked at a loss.—G.M.R.

NASH, E. F. **Food and agriculture in Germany.** *J. Proc. agric. econ. Soc.* **7.** 145-59. 1947. **474**

The statistics relate to the old German Reich before the territorial acquisitions in 1938 and later years. The arable area decreased from the pre-war years to 1944. The area under rye, wheat, fodder grains and potatoes all decreased, but the area under sugar beet increased. The position was much the same with regard to production. The numbers of cattle, dairy cows and sheep increased, compared with a fall in the numbers of pigs, poultry and horses. The production of oilseeds was given special encouragement during the war, with the result that the 1944 acreage was about 8.5 times the pre-war average. The supply of grain for feeding was about 25 per cent lower in 1943-44 than before the war, while the quantity of potatoes fed to animals was approximately halved, and the supply of oilcakes was reduced by three-quarters. The appearance of a real food crisis in Germany coincided with the imminent end of the war and the loss of control of the central authority. The reasons for the post-war decline in the level of consumption are discussed, and considerable attention is given to the future food economy of Germany. It is pointed out that physical recovery cannot be achieved rapidly, and that the future political and economic structure of the country will be decisive. The effect of the zonal organization on the national agriculture is discussed.—T.G.J.

INDIAN DELEGATION. **Report on co-operative farming in Palestine.** pp. 103. **475**

The report deals in detail with the social and economic aspects of Jewish co-operative farming and compares conditions under individual farming, co-operative settlements and collective settlements. The private villages are the largest, and because they are situated in that part of Palestine where citrus cultivation is most important the percentage of area under fruits and irrigated crops to total cultivated area is highest. But the percentage of total area under cultivation is higher on the co-operative settlements. In the collective settlements income is fairly evenly distributed amongst dairying, cereals, vegetables, fruit plantations and poultry. There has been an increase in the use of machinery particularly tractors and lorries, but fertility maintenance, erosion control, drainage and reclamation have been noteworthy improvements.

The basis of land allocation is the same as followed for the co-operative settlements, viz., about 6 acres of irrigated land or about 24 acres of dry land per family (1 man and 1 woman). Mixed farming is the rule in all co-operative settlements.—T.G.J.

KENTUCKY Agricultural Experiment Station Bull. 516. **Effect of improved land husbandry on income and organisation of rolling land farms.** By *G. B. Byers* and *W. G. Survant*. 1948. pp. 23. **476**

The bulletin stresses the need for economical accomplishment of at least three fundamental objectives in any sound programme of land management: (1) use of all land within the limits of its natural adaptations; (2) control or management of water to prevent erosion on sloping land and (3) a vigorously growing ground cover of useful vegetation for as much of each year as is feasible. The effect of a programme of soil conservation was studied on two farms in typical areas. The cropping data for Farm 1 from 1941 to 1946 reveals that the acreage of corn increased from 25 to 27; wheat decreased from 0 to 15, mixed hay from 20 to 15 and the acreage of rotation pasture decreased from 30 to 3. Whereas expenses on crops rose from $176 in 1941 to $286 in 1946, receipts from crops increased from $219 to $2352 in the same period. On Farm 2 the general position was the same. Corn and mixed hay acreages increased while the acreage under rotation pasture declined. Crop receipts rose from $218 to $840 and crop expenses fell from $216 to $142. Planned fertilization and seeding of the land, proper grazing of pasturage and fire prevention on forest and wildlife areas are stressed for the establishment of a cover of vigorous growing vegetation.—T.G.J.

BOERGER, A. El enlace entre la investigación agronómica y el ambiente productivo rural. [**Contact between agronomic research and the producer.**] Buenos Aires, 1948. pp. 16. [Director, Inst. Fitotécnico "La Estanzuela," Dept. Colonia, Uruguay] **477**

The theme of an address delivered to the Argentine Agronomists' Club in Buenos Aires is that agronomy as a science and the agronomist as a scientist have a mission to fulfil, the culminating point of which is to diffuse as rapidly as possible any knowledge, and especially any new knowledge, which serves to increase or improve agricultural production. There is or should be an analogy between agricultural research and the operational research conducted by the Allies during the recent world war. The successful application of co-operative international research to locust control is noted, and an account is given of the measures taken in the United States, New Zealand, and in various European and South American countries to diffuse agricultural knowledge and make the results of research available to the farmer. Sir Albert Howard's views on the "top-heavy" nature of some types of organization (An agricultural testament, 1940) are discussed in passing, with a commendation of his insistence on the pre-eminent value of field work in agricultural research. Finally ways of disseminating agricultural knowledge and of inducing a sense of social responsibility are discussed with special reference to the psychological aspect of the problem. Persuasive, advisory work will always accomplish more than decrees and regulations.—G.M.R.

ÅKERMAN, Å. Skördetröskningens konsekvenser. [**The consequences of combine harvesting.**] *Lantm Svenskt Land*. **32.** 805 and 810. 1948. [Director, Swedish Seed Association, Svalöf] **478**

The transition to combine harvesting has meant such a decided rationalization and reduction in costs of harvesting and threshing that with the prevailing shortage of labour, the method must be adopted. It is necessary to ensure in time that the combined products are handled and stored in the most rational way, and also to see that crop cultivation and especially the cultivation of cereal crops and of oil crops are so arranged that they are suitable for the new method.—R.P.J.

SEEDS

FLEMION, F. and POOLE, H. **Seed viability tests with 2, 3, 5-triphenyltetrazolium chloride.** *Contr. Boyce Thompson Inst.* **15.** 243-58. 1948. **479**

Results of the tetrazolium test on a wide range of seeds were compared with those of the rapid viability test (excized embryos grown on filter paper in Petri dishes for 2-7 days). Significant correlation was obtained for the large set of data available but the deviation in many individual tests was so great that it made the reliability of a given tetrazolium test rather questionable. Further researches are needed before the technique can be finally recommended.—K.J.S.

DENNY, F. E. **The role of the surface micro-flora in measurements of the respiration rate of germinating seeds.** *Contr. Boyce Thompson Inst.* **15.** 211-27. 1948. **480**

Respiration experiments were performed on untreated seeds and on seeds treated with fungicides sufficient to inhibit growth of micro-organisms on seeds for 24-48 hours. The seeds were wheat, buckwheat, rye, barley, maize and bush bean; the fungicides were Spergon, Puratized N_5E, Tersan and calcium hypochlorite. There were no significant differences in CO_2 production between treatments and control except with wheat and rye and in one out of two tests with buckwheat. In a further experiment in which the seed was dipped in a suspension of micro-organisms obtained from the seeds, CO_2 production was significantly higher than in the water controls but the difference never exceeded 10 per cent. Should small differences of results from these causes seem likely, the method described is capable of detecting and measuring the effect.—K.J.S.

Meer, H. E. van der. Zaaizaadproductie en -export. [**The production and export of seed.**] *Landbouwk. Tijdschr.* **60.** 422-9. 1948. [Assn Agric. Seedsmen, The Hague] **481**

Seed-growing areas certified as satisfactory by the General Netherlands Inspection Service have increased within the last decade as follows, in hectares :

	1937	1948
Cereals	9,093	74,059
Pulse	1,566	11,138

Exports have similarly increased, as follows, in tons :

	1937	1947-48
Cereals	3,770	22,168
Pulse	2,925	6,981

Before 1940 exporting was done by individuals. After the war, to meet centralized importing by foreign countries, Netherlands seed exports were centralized through an association formed for the purpose, but though 84 per cent of the 1945-46 exports were handled in this way, the proportion fell to 50 per cent the next year and in 1947-48 it was only 9 per cent. The association still exists, but serves mainly to maintain contact between the Dutch sellers and foreign buyers. The author describes the development of the growing and export of seed of industrial crops such as flax (the most important) and rape, of forage crops such as winter and summer rape and mangels, and of sugar beet, and discusses, from the viewpoint of the Netherlands exporter, factors which affect the seed market, and future prospects.—G.M.R.

DISEASES, PESTS AND PARASITES

Silvo, O. Hur skall jordbrukaren skydda sig mot förrådsskadedjuren ? [**How can stored products be protected from noxious animals ?**] *Tidskr. Lantm.* **30.** 166-7. 1948. **482**

In Finland the most important insect pests of stored products are *Aleurobius farinae*, *Sitodrepa panicea*, *Ptinidae*, *Tenebrio molitor*, *Tribolium castaneum*, *Ephestia kühniella*, *Bruchus pisorum* and *Bruchidius obtectus*. To combat the above-mentioned pests the simplest method is to store the products, for example grain, in as low a temperature as possible. Some insects can tolerate extreme cold : *Niptus hololeucus* is active in a temperature as low as—1°C. Insect poisons which are innocuous to man and domestic animals may be used. A method employed in Sweden recently which has proved effective is to mix DDT powder in grain attacked by insect pests in the proportion of 1 : 1000. The best preventive measure in the control of all noxious animals is absolute cleanliness of grain warehouses and in particular of grain containers. Very serious losses are caused every year by rats and mice : they should be controlled by means of poisonous preparations, care being taken to ensure that domestic animals are excluded from the warehouses. Some parastic fungi injure stored grain. The most important preventive is thorough cleanliness and good ventilation. The grain containers should be washed with formalin solution during the annual cleaning.—R.P.J.

Weston, W. A. R. D. and Taylor, R. E. **The plant in health and disease.** 22 × 14. pp. xii + 173. London, Crosby Lockwood and Son, Ltd., 39 Thurloe St., S.W.7. 1948. 21s. **483**

A semi-popular review of the fungous diseases which attack British crop plants, the symptoms of the disease, and methods of control by breeding resistant varieties, seed disinfection, spraying or merely by good husbandry. There is an appendix classifying the diseases under host, common name, family and Latin name of the fungus concerned.—R. O. Whyte.

Valentin, R. Le poudrage des cultures par avion. [**Dusting of crops by aeroplane.**] *Potasse* **22.** 148-50. 1948. **484**

Dusting of crops by plane makes it possible to protect a large area at the exact time when protection is required ; it does not damage the crops and its operation is independent of the state of the ground.

Certain conditions must be fulfilled since the powder must penetrate to the interior leaves of the crops where the pest hides, the powder must be in a finely dusted condition yet it must be heavy enough to fall on to the crops and not be carried away by the wind. The grade of fineness required varies inversely with the strength of wind.

The various mechanisms in the plane for operating the dusting process are described.—D.B.

Biraghi, A. Osservazioni e considerazioni sul disseccamento batterico del granoturco. (Xanthomonas [Aplanobacter] Stewarti) in Italia. [**Observations and considerations on bacterial wilt of maize** (*Xanthomonas* [*Aplanobacter*] *Stewarti*) **in Italy.** *Ann. Sper. agrar.* **2.** 515-24. [English summary, p. 523.] 1948. **485**

This disease had not been found in Europe until 1935 when it was first detected in Italy. At present it has spread to almost all maize areas situated on the left of the Po river. Losses in yield up to 65 per cent in weight are reported. Comparison is made with the disease as it occurs in the United States of America, and attention is given to the absence in Italy of the insects to which, in the United States, the propagation of the disease is attributed. Laboratory trials have revealed that *X. Stewarti* can establish itself inside the seed, arriving at it through the vessels, thus transmitting the infection from one year to the other.—E.B.

DELLA BEFFA, G. Studi su alcune infestazioni di Fasgonuridi e Locustidi in Piemonte, nel 1947, e prime esperienze di lotta. [**Studies on some infestations by Phasgonuridae and Lucostidae in Piedmont, in 1947, and first experiments on their control.**] *Ann. Sper. agrar.* **2.** 567-89. [English summary, p. 588] 1948. **486**

The gregarious condition of *Orphania denticauda* Charp. was observed for the first time in Italy in the province of Cuneo and of *Decticus verrucivorus* L. in the province of Vercelli. Damage caused to pastures and crops and control measures adopted are described. The different associations of Orthoptera in Val Chisone (province of Turin) in relation to environment and height are described, and damage caused and first control trials are reported. Results obtained with Gammexane used in various concentrations on different species of Phasgonuridae and Locustidae are also given.—E.B.

PEGLION, V. Panorama fitopatologico. 1. Profilassi chimica. [**Phytopathologic panorama. 1. Chemical prophilaxis.**] *Ital. agric.* **85.** 671-82. 1948. **487**

In this review, which has been the subject of three conferences held at the Bologna Association of Agriculturists, the author examines the development through times of plant diseases (only in the last two centuries have they assumed epidemic forms) and of remedies adopted. Bunt of wheat is given particular attention. In examining chemical remedies, damage caused to seeds by chemical disinfection is noted.—E.B.

MALLAMAIRE, A. Acridiens migrateurs et acridiens sédentaires en Afrique Occidentale. [**Migratory and sedentary** *Acrididae* **in West Africa**] *Agron. trop.* **3.** 630-4. 1948. **488**

Acrididae, different species of which are described, are reported to cause damage to sorghum, millet, cotton, manioc, maize, and rice. For the control of the sedentary forms, organic compounds of chlorine, such as hexachlorocyclohexane and others, are sufficient to destroy the larvae in a few hours. Generally a mixture of 10-25 per cent of the product, an inactive powder (talcum or kaolin), and a suitable emulsion, is used. Thus they can be used in pulverization (in solution at 2-5 per cent according to the dosage of the product) or in powder (at the rate of 10-20 kg. per ha. according to the quantity of active product in the powder.)—E.B.

LINDE, W. J. van der, SMITH, A. J., and NEETHLING, L. J. **Control of eelworm.** *Fmg S. Afr.* **23.** 509-16 and 546. 1948. **489**

Eelworm is a small round worm or nematode responsible for a condition known as 'root-knot', prevelant in many varieties of plants. It is of economic significance throughout all parts of the globe, but especially so in the warmer regions. Characteristics and symptoms of the disease are given, together with the life-cycle and habits of the eelworm. Prevention and control measures, stressing desiccation of the soil, fallowing and rotation of crops, are discussed. The use of D-D, the new soil fumigant, in small plots such as seed-beds, is particularly recommended, because if healthy seedlings are transplanted, clean lands cannot become infested, and if this condition is achieved, higher yields of good quality may be expected. Healthy plants have a better chance of producing a crop in infested lands, than infested plants, but if the soil is made free from injurious bacteria and fungi by D-D fumigation, permanent seed-beds can be established.—J.T.B.

HAMMOND, G. H. **The distribution, life-history and control of** *Phyllophaga auxia* **Lec. in Quebec and Ontario.** *Sci. Agric.* **28.** 403-16. 1948. [Divn Entomol., Ottawa] **490**

June beetles in Eastern Canada have a 3-year life cycle ; there are 3 broods in Quebec and 2 in Ontario. The second year grub is the most destructive stage and the most favourable periods for treatment are during late summer when first year grubs are active, or early summer of second year grub activity. At both seasons the grubs are near the surface and can be destroyed to some extent by plough and disk cultivation. Special treatment of grass sod, in which eggs are generally deposited, consists in late summer ploughing to 3 in., followed by five disk harrowings with weighted harrows, or four if a tractor is used. Pupae formed in midsummer can be eradicated only by deep ploughing, which is costly and inconvenient. Beetles may be tackled by spraying trees with lead arsenate (1 lb : 20 gal.) or DDT at mid-May. Crop rotations should include immune crops in the flight or outbreak year ; a 3-year cycle recommended is maize or roots/grain/clover hay, the grain and clover being planted in the flight year when the beetles are ovipositing. Three or 6-year rotations are chosen to synchronize with the 3-year rhythmic cycle of the insect. Susceptible crops should be grown on heavier soils. DDT and B.H.C. are promising soil treatments ; soil fumigants such as methyl bromide are very effective but costly.—K.J.S.

United States Department of Agriculture, Bureau of Entomology and Plant Quarantine. **A second list of publications on Benzene Hexachloride.** By *C. V. Bowen.* 1948. pp. 38. **491**

Fennah, R. G. **Insect pests of food crops in the Lesser Antilles.** 16 × 23. pp. 207. Grenada, B.W.I.: Department of Agriculture; Antigua, B.W.I.; Department of Agriculture. 1947. [Ent., Food-crop pests Invest., Windward and Leeward Isl., B.W.I.] **492**

"An attempt has been made to list every insect pest found by the writer or recorded by others on garden crops in the Lesser Antilles, and to include any important pests of such crops present in the Greater Antilles or on the mainland which might be serious if they were to appear in this area."

Illustrated descriptions of the insect pests of root crops, cereals, legumes, and miscellaneous vegetables, and methods of their control are given. There are short notes on insecticides, and indexes of genera, species and crops are included.—K. Oldaker.

Argentine Republic, Ministerio de Agricultura Ser. B. Vol. 3. No. 10. Las hormigas podadoras del Brasil. Informe sobre una gira de estudio. [**The pruner ants of Brazil. Report on a study tour.**] By *J. C. Otamendi.* 1947. pp. 48. [Inst. Plant Health, Min. Agric., Argentina] **493**

Ants of the genera *Atta* Fabr. and *Acromyrmex* Mayr. are the cause of very heavy annual crop loss in South America. Research and the organization of control have gone further in Brazil than elsewhere, and the present pamphlet reports on the author's study tour in that country. It gives an illustrated account of research at the Biological Institute of San Pablo, of the measures of control commonly employed in Brazil and of organization, and draws conclusions as to the desirability of similar organization in Argentina.—G.M.R.

WEEDS

Hitchcock, A. E., and Zimmerman, P. W. **Activation of 2,4-D by various adjuvants.** *Contr. Boyce Thompson Inst.* **15.** 173-93. 1948. **494**

Following greenhouse tests showing that lethal and non-lethal concentrates of contact herbicides used in combination with 2,4-D killed tomato plants quicker than either of the two components, experiments are described with Benoclor 3 C (chlorinated benzene) and certain other compounds used with 2,4-D, namely ammonium thiocyanate, ammonium sulphamate, Hammond's Weed Killer, diallyl maleate, and sodium bicarbonate and sodium chloride. Mixtures of 2,4-D with all of these were more effective than any of the individual components used at the same concentration as in the mixture. The effect was judged by hormone-curvature responses, initial injury to foliage, and killing of the plant. The substances which increased the herbicidal activity of 2,4-D appear to function as general toxicants in altering the permeability of the tissue and thus hastening the entry of 2,4-D. 2,4-D itself may be included in activators which function as toxicants, but this applies only to concentrates below which 2,4-D does not inhibit growth.

Mixtures containing 0.32 per cent ammonium thiocyanate and 0.00001 to 0.0001 per cent of 2,4-D caused greater injury to tomato foliage and a greater delay in growth of the plant than 0.32 per cent of ammonium thiocyanate used alone. Here 2,4-D was evidently the activator, stimulating the tomato by increasing the rate of stem elongation. In other tests, however, ammonium thiocyanate activated lethal concentrations of 2,4-D (0.05—0.2 per cent). General purpose weed killers containing more than one hormone, at least one toxicant, and adjuvants such as wetting agents, stickers, etc. are postulated.—K.J.S.

Åberg, E., Hagsand, E., and Väärtnöu, H. Hormonderivat i kampen mot ogräs. V. Fältförsök 1946-1947. [**Hormone derivatives against weeds. V. Field experiments in 1946-1947.**] *Vaxtodling. Plant Husbandry* No. 3. pp. 8-64. pls. 8. [English summary, pp. 61-3.] 1948. [Royal Agric. Coll., Sweden] **495**

Hormone derivatives were effective under Swedish conditions against *Sinapsis arvensis*, *Brassica arvensis* and other crucifers but damaged only slightly *Stellaria media*, *Galeopsis* spp. and *Spergula arvensis*; *Cirsium arvense*, *Plantago major*, and *Taraxacum* spp. were badly damaged in the year of spraying and survival in the next year was doubtful. Seed set was reduced in surviving plants of *Taraxacum* spp., *Thalaspi arvense* and *Chenopodium album*; seed germination was zero in *Taraxacum* from sprayed plots and much reduced in *Matricaria indora*. Safe concentrations of Agroxone and 2,4-D preparations for use on cereals, linseed, grasses for seed production and grass swards are stated. Cereals are sensitive to spraying at 2-4 weeks after emergence (i.e. at tillering) and should be sprayed early. Very low concentrations appear to stimulate crop growth. Peas are the only legume crop that can be sprayed in practice; white clover is damaged in the first year. Seeds of resistant crops develop normally unless panicles have been injured by too high concentrations. Chemical composition of seeds is not influenced by spraying, except that the crude protein content is said to be increased. Methoxone and 2,4-D appear to be similar in action on cereals and seed grasses ; in flax, methoxone is preferred and on grassland, the 2,4-D group.—K.J.S.

OSVALD, H., and ÅBERG, E. Kampen mot ogräset. **Weed control.** *Växtodling. Plant Husbandry* No. 3. pp. 74-92. [English summary, 90-2.] [Royal Coll. Agric., Sweden] **496**

Based on the results of field experiments in Sweden and in Britain and U.S.A., spraying rates are published for weed control in cereals and flax, by copper salts, D.N.O.C. dinitrobutylphenol and the hormone derivatives available on the Swedish market. A table gives the relative susceptibility and resistance of 64 crops, 100 weed species and 20 woody species to practical concentrations of weed killers. Recommendations : Sodium chlorate at 200 kg. per ha. in autumn against perennial weeds ; cyanamide at 100-400 kg. per ha. before sowing or 200-300 kg. per ha. for dusting after emergence against annual weeds ; 100 kg. cyanamide per ha. may be applied to asparagus beds ; sulphuric acid at 1000 litres per ha. of 4 per cent concentration against annuals in cereals ; copper salts at 1000 litres of 1.5-2 per cent solution against weeds in legume crops and flax ; D.N.O.C. at 7.5-10kg. per ha. in 1000 litres water. Dinitrobutylphenol has been used at 5 kg. per ha. on weeds in peas, clover lucerne and strawberries.

Hormone preparations marketed in Sweden are :—Agroxone and P 46 ; 2,4-D preparations ; Adlerbolagens 2,4-D, Dif, Erpan, Ewosan J., Filco, Grasso 2,4-D, Herbasan H, Philips 2,4-D, Weedone, Wormosan and 2,4-Dow weed killer. Safe concentrations for cereals, seed grasses, linseed, pastures and lawns are stated. Ester derivatives are more effective than the free acid but are more phytocidal and should be used at lower concentrations. The standard rate is 1.0 kg. methoxone or 0.5-1.0 kg. 2,4-D per ha. for cereals and less for linseed. Annual weeds and some perennials are controlled. Cereals are susceptible in the tillering stage and at shooting and spraying must be avoided at these stages. Injuries caused by hormone sprays, e.g. abnormalities in ears and panicles and decreases in kernel size and germinating power are described. Hormones are generally used as sprays ; soil applications may persist for 2-3 months.

Mineral oil preparations are useful against weeds of carrots, parsnips and parsley ; " Varnolene " should be sprayed early at 500-600 litres per ha.

Four types of spraying machines are available in Sweden.—K.J.S.

MINISTRY OF AGRICULTURE AND FISHERIES. Advisory Leafl. No. 46. **Docks and sorrels.** 1948. pp. 4. **497**

This leaflet describes control measures against various kinds of docks and sorrels. Brief descriptions of the more common types of *Rumex* species and illustrations of *Rumex crispus* (curled dock) and *R. acetosella* (sheep's sorrel) are given together with parts of the Corn Production Acts (Repeal) Act, 1921, and the Seeds Act, 1920, relating to injurious weed seeds, including those of *Rumex* species.—K.O.

FARMER'S WEEKLY. **Organic weed-killers open new possibilities.** *Fmr's Wkly Bloemfontein* **76.** 95. 1948. **498**

A broadcast discussion on the application and properties of weed-killers and hormone weedicides, indicated that greatly increased yields would result from the use of 2,4-D, though more experiments must be carried out to assess the response to hormone weed-killers. Some deep-rooted perennials and most grasses though not killed by the weedicide when adult, may be injured during certain growth stages.

Rates of application in the solution, emulsion and dust forms and effects of the hormone character on some crops were discussed. Investigations are in progress for the new pre-emergence treatment of the soil before the crop is planted. Other attributes of hormone weed-killers are their non-toxicity to humans and animals and non-corrosiveness to equipment and clothes.—K.O.

BIBBEY, R. O. **Physiological studies of weed seed germination.** *Plant Physiol.* **23.** 467-84. 1948. **499**

Longevity of annual weed seeds in grain lands is a serious problem. A seed may be dormant because environmental conditions are unsuitable (environmental dormancy) or the seed may be unable to germinate in suitable environment because of some physiological condition (inherent dormancy) ; the terms correspond to " induced " and " natural " dormancy (Brenchley and Warington). Inherent dormancy may be primary, i.e., existing from seed maturity until it is ready to germinate (due to impervious seed coat, etc.) or secondary (connected with after-ripening). Results are recorded of a study of retarded seed germination in conditions simulating those in the soils of Western Canada characterized by extremes in temperature during winter and summer and relatively low rainfall. Seeds of *Thalaspi arvense* and *Brassica arvensis* which have a reputation for persistence in soil, germinated rapidly on removal after several years in the soil ; *Melilotus alba* seeds required scarification but were still in a state of primary dormancy after 17 years. The evidence is that environmental dormancy is the major factor in their longevity. *B. arvensis* and *T. arvense* were much more susceptible to low oxygen or high CO_2 pressures than *B. juncea* or *Triticum vulgare* which are relatively short-lived in soil.—K.J.S.

CEREALS

ÅBERG, E. Naket korn i Sverige. [**Naked barleys in Sweden.**] *Kungl. Lantbruk. Tidskr.* **87**. 333-45. [English summary pp. 344-5.] 1948. **500**

The naked barley at present most frequently grown in Sweden is the yellow-grained (var. *coeleste* L). The violet-grained was cultivated previously but has now been replaced by yellow-grained. During the last few years a new violet-grained variety has been tested, but its possibilities for extension are very restricted. Green-grained types (var. *himalayense*) are no longer grown. At present in Sweden naked barley is grown on very small areas: none of the plots is larger than one hectare. Naked barley is used mainly in northern Sweden for bread-making. It gives a lower yield than hulled barley, and has weaker straw. Vegetative growth is more luxuriant in naked barley so that it is particularly suitable for use as green fodder. The aims of breeding should be stiffer straw and higher yield. The Netto strain from Holmberg Plant Breeding Station, Norrköping, represents the first attempt in this direction.—R.P.J.

BJAANES, M. Dyrking av høstsæd øker brødkornavlen. [**The cultivation of autumn-sown cereals increases the bread grain harvest.**] *Norsk Landbr.* **14**. 291-3. 1948. **501**

Cereal crops in Norway are preponderantly spring-sown and consist almost exclusively of oats, barley and spring wheat. The area of autumn-sown cereals should be increased: in a few cases they can be sown after early potatoes or early cut green fodder, but they are usually sown on the ploughed up ley. If the ley is not old with a tough sward and if the soil is suitable, autumn wheat grows well. At Moistad Experiment Station on the average for 9 years (1939-47) Sigyn autumn wheat gave a yield of 348 kg. grain per dekar. The average yield of Stål rye for 1936-41 was 349 kg. grain per dekar. All the fields of wheat were on ploughed up second year ley, of rye partly second year and partly third year ploughed up ley. On the average for 17 years (1923-41) Stål rye gave 294 kg. grain per dekar. Maja barley gave on the average for 1935-46 a yield of 368 kg.; spring wheat, Fram II, 1934-41, gave 300 kg., and oats, Golden Rain II, 1935-41, 322 kg. grain per dekar. Thus autumn wheat and autumn rye compete with the best spring cereal varieties in yield, and give a larger yield than spring wheat. Variation in yield from year to year was rather less for autumn cereals than for spring cereals. By growing autumn-sown cereal crops bread grain cultivation can be increased at the expense of oats.—R.P.J.

VALLAEYS, G. Le " Coix Lacryma-Jobi " [**Job's Tears.**] *Bull. agric. Congo belge* **39**. [247-304. 1948. **502**

Coix is a small genus of Gramineae with only 2 or 3 species of which *C. lacryma-Jobi* L. is the most known. This species originated in the East Indies where, in the past, it seems to have been widely cultivated and then replaced by rice. Its cultivation and spontaneous growth is widespread in equatorial, tropical and sub-tropical regions of all the continents, although it is never grown on a large scale. Its uses are numerous: as a cereal for human consumption, as fodder, and for medical purposes. It is also known as a weed in rice fields. In the Belgian Congo, trials have been carried out on this plant by the " Division des Plantes vivrières de l'Inéac " at Yangambi; its place in the rotation has been fixed at the first season and is followed by rice or potato (2nd season) soybean, *Vigna* (3rd season), ground-nut (4th season).

This article supplies information on the plant botany, geographical distribution, uses, influence on soil, cultivation, husking, yield, pests, production cost, improvement. The author is of the opinion that cultivation of *Coix lacrima-Jobi* could be valuable for improving the food situation in many regions.—E.B.

GRILLOT, G. Le problème de l'amélioration du maïs au Maroc. [**The problem of maize improvement in Morocco.**] [Contained in] L'amélioration du maïs. pp. 13-33. Maroc, Direction de l'Agriculture du commerce et des forêts. 1948. **503**

In Morocco, maize is cultivated over 500,000 ha. in some places under irrigation. It is mostly an indigenous cultivation and yields are low, averaging 6-12 bu. per acre. General information on maize and its improvement is supplied. Account of first improvement works carried out by the Centre of Agronomic Researches of Rabat and programmes of future work are also given.—E.B.

BOTTON, H. Rapport sur le maïs. [**Report on maize.**] [Contained in] L'amélioration du maïs. pp. 35-76. Maroc, Direction de l'Agriculture, du Commerce et des forêts. 1948. **504**

This report first deals with systematics, biology and origin of maize. Importance, cultivated area and production of maize in the world, and in Morocco in particular, are then considered. In a chapter dealing with genetics of maize, scientific works and means of improvement are reviewed. In the aim of extending this cultivation in Morocco and mainly of increasing yields, improvement of cultural methods and genetic improvement are to be pursued.—E.B.

QUEENSLAND, DEPARTMENT OF AGRICULTURE AND STOCK. Division of Plant Industry. Pamph. No. 121. **Maize.** By *C. J. McKeon.* 1948. pp. 20. **505**

Account is given of the cultivation, sowing, harvesting and storage of maize in various districts of Queensland. Though costs of production are high, this should be lessened by use of modern machinery such as the double-row seed drill and cultivator, and the combined husker and sheller. Seed selection occupies an important part in the production of maize. Correct topping and tailing of the ears should be practised because more even sowing results and because this prevents the spread of disease (e.g. *Diplodia* ear rot) from the butt to the tip. There are excellent descriptions with illustrations, of classes of maize and the yellow varieties, Funk's 90-Day, Star Leaming, Reid's Yellow Dent, Funk's Yellow Dent, Golden Beauty, Improved Yellow Dent and Durum. Of the white varieties, Boone County White and Silvermine gave the best results. Work is in progress at the Queensland Agricultural High School and College and it is hoped that hybrid maize will soon be available for general distribution.—K.O.

REICHEL-DOLMATOFF, G. El cultivo del maíz y la etnología en el noreste de Colombia. [**The cultivation of maize, and ethnology in the north-east of Colombia.**] *Agric. trop.* **4.** No. 1. 7-12. 1948., [Director, Inst. Ethnology of the Magdalena, Colombia] **506**

The origin of maize has been variously believed by different authors to be in Paraguay, Peru and Mexico. On the basis of his own investigations, the present author considers that the lower reaches of the Magdalena river in Colombia may well have been the centre of origin of the primitive South America horticulture and thus the cradle of maize cultivation. He quotes K. Birket-Smith, "The origin of maize cultivation," in support of his findings and draws attention to the extensive ancient irrigation systems and terraced control of erosion found on the slopes of the Sierra Nevada in this region.—G.M.R.

PARODI, L. R. Los maices indígenas de la República Argentina. [**The races of maize indigenous in the Argentine Republic.**] *An. Acad. Cienc. Buenos Aires* **12.** 9-14. 1947. [Prof. Bot. Univ. Buenos Aires and Univ. La Plata, Argentine Republic] **507**

Abstract of a dissertation presented to the Darwinion Institute of Botany in July, 1947.

In isolated pockets of two subtropical regions of Argentina there still exists a primitive form of agriculture based on the cultivation of pre-Hispanic crop plants, prominent among which is a diversity of autochthonous races of *Zea mays*.

Region 1, formerly under the domination of the Guaraní Indians, embraces the eastern Chaco and the area between the rivers Paraná and Uruguay. It is a relatively humid region of forest and savannah, where no irrigation is necessary. The maize races grown here belong to the groups amylacea, indurata and oryzaea, the first being the most important and widespread. The different types are described. Some characteristics of the regional maize (coloration of the aleuron, bitterness, etc.) are extremely rare or absent in the Andean region. *Z. mays tunicata* Larrañaga also originates in this region.

Region 2, formerly dominated by the Inca civilization, consists of the north-western Andean valleys and is a southern prolongation of the vast Peruvian-Bolivian centre of plant domestication. The maize cultures are found generally under irrigation, in valleys and by watercourses at altitudes ranging from 500 to 2500 m., and the number of autochthonous races probably exceeds 150 although the diversity diminishes as one goes southwards. Excepting *Zea mays saccharata*, all the groups into which the species has been divided are found, in the following order of importance: amylacea, indentata, indurata, microsperma, oryzaea, amyleasaccharata.

These indigenous races constitute a great wealth of material, the botanical and genetic study of which has been as yet only fragmentary and which is in great danger of being lost through gradual replacement by more well-known, introduced varieties. A plea is made for State protection of what may be of unsuspected value for the agriculture of the future.—G.M.R.

HUNTER, H. **The economic value of the oat crop.** *Fmg* **2.** 294-7. and 302. 1948. **508**

Reasons for the English oat crops wide geographical distribution are presented, and the chemical composition of oats as compared with that of wheat and barley is given and discussed. The varietal differences in husk content of the oat are noted and also the use made of oat straw as fodder. Different varieties of both spring and winter oats are described and the need for a positive relationship of the variety to its environment is stressed.—J.T.B.

COYAUD, Y. Notes sur la durée d'évolution des variétés de riz cultivées en Indochine. [**Notes on the vegetative period of the rice varieties cultivated in Indo-China.**] *Agron. trop.* **3.** 266-73. 1948. **509**

Influence of climatic factors, of time of sowing and transplanting, and of other cultural practices is considered. A description is given of how the vegetative period of the numerous cultivated varieties is adapted to the different conditions which occur in this country.—E.B.

WARREN, H. L. **Rice as a crop in Japan.** *J. Amer. Soc. Agron.* **40.** 579-602. 1948. [Colo. Agric. Exp. Sta. Fort Collins, Colo.] **510**

Rice, the staple food crop of Japan, is grown on 53 per cent of the total cultivated area. Practically all this rice is short-grained and most of the crop consists of common type paddy, grown on the irrigated lowlands. In the Kyushu and Kanto districts some upland rice is grown. There are wide differences in total rice production per year. Low yields from poor harvests, are due to climatic factors, diseases and insect pests, and lack of fertilizers and manpower. The most serious diseases of rice are blast, sesame spot, stem rot, bakanae disease, seedling rot and stunt. Insect pests causing damage are the two and three-brooded rice borer and leaf hoppers. The crop is grown by the transplanting method to permit a fall-sown wheat or barley crop to mature before the rice is transplanted. Thus two cereal crops can be grown on the same land per year.

Although direct reseeding allows one cereal crop per year, farmers who practice this system in Hokkaido claim the yields are the same as with the transplanting method. Labour requirement for rice production is high. After harvesting with hand sickles, the crop is dried on the ground or on racks, and then threshed by man or motor power. The threshed rough rice is cleaned by sieves or winnowing machines and later de-hulled to so-called brown rice—which is milled for human food. The loss in milling is from 10-15 per cent.

Rice is used primarily for human food ; the straw for making straw bags, forage and manure.—K.O.

Camus, A. Observations sur le *Triticum dicoccöides* (Korn.) Sch. et l'*Hordeum ithaburense* Boiss. [**Observations on** ***Triticum dicoccöides*** **(Korn.) Sch. and** ***Hordeum ithaburense*** **Boiss.**] *Rev. Bot. appl.* **28.** 72-3. 1948. **511**

Tarade, R. de. Sur le berceau de quelques plantes cultivées qui s'observent encore a l'état spontané au Liban. [**On the origin of some cultivated plants which are still found spontaneous in the Lebanon.**] *Rev. Bot. appl.* **28.** 70-2. 1948. **512**

Triticum dicoccoides and *Hordeum ithaburense* are found associated.—E.B.

ПРЕСНЯКОВА, Г. А. Влияние степени смытости почв на урожай сельскохозяйственных культур в подзолистой зоне. *Почвоведение*, 1948. *No.* 9. стр. 539-52.

Presnjakova, G. A. [**The effect of the degree of soil wash-off on crops in the podzol zone.**] *Počvovedenie*, 1948. No. 9. 539-52. [Soil Inst., Acad. Sci., Moscow] **513**

Field experiments on this problem were carried out at three collective farms in the Krasnopoljansk region of the Moscow Province with winter wheat, rye, oats and barley. The adverse effects of eroded soil on the plants include thinner stems, shorter ears and smaller grain. Tillering is also affected. Other factors apart from wash-off determine plant growth, and include slope, exposure, moisture and wind. So-called vegetation experiments have therefore been made. These were carried out at the Dolgoprudnyĭ Agro-chemical Expt. Sta. with the "Viner" variety of barley, under uniform conditions of light, temperature, moisture and wind. The results confirm those of the field tests and indicate, in addition, the beneficial effects of fertilizers when applied to washed-off soils.—M.H.

The Countryman. **Abandon the cereal-fallow system!** *The Countryman.* **2.** 1-2. 1948. [Cyprus, Dept. Agric. Nicosia] **514**

Because of the growing population, Cyprus cannot afford to continue the wasteful system of cereal/fallow as practised in the unirrigated areas of the country. A new system, that of growing a grazing crop on land otherwise fallow has proved by experiment to be efficient and should be instituted immediately. The three main objects of the cereal/fallow practice are adequately covered by growing a mixed leguminous crop for grazing. The growing crop, not only conserves moisture in the soil, but the leguminous plants, closely grazed, and immediately ploughed in, ensure the adequate retention of nitrogen for the future use of the cereal. With correct cultivations and the utilization of selective weed killers, weeds are controlled effectively.

The Director of Agriculture is satisfied as to the benefit of the grazing crop/cereal system and is confident if farmers once tried the system in part they would soon adopt it over their entire holdings. —K.O.

Powell, E. C. **Stubble mulch or bare fallow for wheat production.** *Agric. Gaz. N.S.W.* **59.** 505-9. 1948. **515**

Stubble mulch cultivation, the method of soil preparation, including seed-bed formation and sowing, which aims at retaining on the surface soil all of the straw from a previous crop to act as a protective mulch, is suggested in this report to be a substitute for the present system of bare fallow for wheat production. The advantages and disadvantages of the two systems with regard to wind and water erosion, weed control, and general farm management and economy are discussed. The writer believes that stubble mulching though not yet a proven practice may provide the essential benefits of bare fallowing and eliminate its faults. —K.O.

Gupta, P. S., and Mitra, A. K. **Double cropping of rice as a means of increasing production.** *Indian Fmg* **9.** 96-8. 1948. [Ass. Econ. Bot. (Paddy) Rice Res. Sta., Nagina (P.S.G.): Econ. Bot. Gov. U.P. Kanpur (A.K.M.).] **516**

By assuring an adequate supply of water an early variety of *Oryza sativa* was grown between April and July. Then on the same ground a late coarse variety was planted and harvested at the end of November. Manuring of the late variety produced large yield increases and helped to nourish the double-cropped soil. The economics of double cropping were also studied. Allowing for all increased costs there was still a net profit per acre. These results would suggest the adoption of double-cropping practices in the United Provinces during times of shortage wherever available manuring and irrigation conditions are suitable.—M.E.E.

LUDOLF, A. de M. Cultura do arroz. [**Rice growing.**] *Agronomia, Rio de Janeiro* **6.** 261-303. 1947. **517**

The author discusses in considerable detail the history of rice growing in Brazil, the botany of *Oryza sativa* and its phenology, varieties (with a detailed description of eight long-grained varieties), the requisite soil and its preparation, manurial treatment, sowing, cultural treatment and irrigation, harvesting and threshing, pests and diseases, processing, and nutritive value.—G.M.R.

FERREIRA, J. C., Jr. Aspectos da cultura do arroz. [**Aspects of rice cultivation.**] *Agronomia, Rio de Janeiro* **7.** 89-96. 1948. [Prof., Esc. Nac. Agron., Univ. Rur., Rio de Janeiro] **518**

Although rice grows wild in Brazil, principally in the marshlands of Mato Grosso, it is believed to have been practically unused for food in pre-Conquest days. Favourable conditions for its cultivation exist in all the States, and from 1917 onwards Brazil has been an exporter of this grain. The author briefly outlines four methods of cultivation, namely, under dry farming as practised in the hill lands, in lowlands permanently under water in the summer, under irrigation, and in transplanted cultures, and discusses methods of harvesting.—G.M.R.

REVISTA DE AGRICULTURA, COSTA RICA. El arroz. [**Rice.**] *Rev. Agric., Costa Rica* **20.** 389. 1948. **519**

Concise instructions for the cultivation of rice, with and without irrigation.—G.M.R.

COUTEAUX, G. Amélioration de la culture du froment en région de Beni-Lubero. [**Improvement of wheat cultivation in the region of Beni-Lubero.**] *Bull. agric. Congo belge* **39.** 555-70. 1948. **520**

This mountainous region of 2000-2400 metres in altitude, is situated in the Belgian Congo, west of Lake Edward. The land is very fertile and intensly cultivated with wheat, potato, pea, kidney bean, colocasia, sweet potato, maize and sugar cane. These crops are mostly grown on steep soils. The region is very favourable to wheat cultivation. With the purpose of increasing yields, it has been necessary to educate the natives in new cultural methods and to obtain wheat varieties resistant to diseases. Sowing takes place about the middle of March and middle of September. Information is given on sowing, weeding, measures against drought and diseases, harvest, terracing of the soil (*Pennisetum purpureum* is employed to form hedges). Selection has been carried out mainly on the variety "Kenya Governor" (soft wheat) and "Sabunero" (hard wheat). The "Golden Ball" and a variety provenient from Morocco have proved to be very susceptible to rust. Results of trials on different varieties and a classification of varieties are given.—E.B.

GRANHALL, I. Kornförädlingen vid Sveriges Utsädesförening 1943-47. [**Barley breeding by the Swedish Seed Association 1943-1947.**] *Sverig. Utsadesfor. Tidskr.* **58.** 308-14. 1948. **521**

See *Plant Breeding Abstracts.*

STARK, E. **Contributions of Russian plant-introduction to the development of Canadian cereal crops.** *Sci. Agric.* **28.** 425-43. 1948. [Univ. Manitoba, Winnipeg Man.] **522**

References dealing with the introduction of cereal varieties from Russia were collected from widely scattered reports in an attempt to promulgate a basis for the evaluation of these introductions, with respect to the improvement of Canadian cereal crops. Famous Canadian and American plant breeders introduced cereal varieties from Russia which were particularly adapted to the Great Plains region of North America. Another source of introduction was through immigrants from Russia and these eventually found their way into Canada.

Flax grown at the beginning of the century and winter wheats grown at present are almost all of Russian origin.

The main characteristics derived from the Russian introduced varieties were :—spring wheat : earliness, high quality and rust-resistance ; barley : earliness, high malting quality and smooth awnedness ; oats and flax : earliness and disease-resistance.

Earliness of ripening has pushed the limits of human settlement farther north. Disease-resistance (especially against rust) has placed Canadian agriculture on a more permanent and prosperous basis. —K.O.

BROWN, W. L. and ANDERSON, E. **The Southern dent corns.** *Ann. Mo. bot. Gdn* **35.** 255-67. 1948. [Pioneer Hi-Bred Corn Company (W.L.B) and Mo. Bot. Gdn (EA.).] **523**

The dent corns of the South are of importance because some of them were extensively used during the nineteenth century in developing the more highly derived varieties of the United States corn belt. After several years of preliminary study a comprehensive collection was assembled and grown in duplicate in Iowa and Missouri. Standardized photographs were made of plants, tassels and ears. Pachytene smears of the pollen mother cells were studied to determine the number of chromosome knobs. Part of this information is given in tabular form.

For the purposes of this discussion the southern dents were grouped into (1) old southern dents and (2) derived southern dents. The former were probably derived from some Mexican varieties. The latter originated from crosses between the old southern dents and northern and tropical flints as well as from crosses with corn-belt dents.

The chromosome knob numbers of the old southern dents in the cultures ranged from 4 to 12. Numbers were higher among the old southern dents than among the derived dents.

The morphology of the southern dent corns is briefly summarized and important varieties, Gourdseed Shoepeg, and Hickory King, are discussed.

The probable usefulness of the southern dents to practical plant breeding and to theoretical genetics is discussed.

It is suggested that they might be more useful for certain desirable characters, such as soft texture, than some of the Mexican and Central American varieties considered. To theoretical genetics, they offer a combination of multiple factor characters which is greatly different from that found in modern United States corn, and still more different from that of the northern flints. By intercrossing these three types of corn, using marker genes and cytological analyses, it should be possible to estimate the numbers of multiple-factor genes involved and their distribution in the germ-plasm.—From Author's summary.

SPRAGUE, G. F. Les bases expérimentales de la production de maïs hybride. [**The experimental basis for production of hybrid maize.**] (Contained in] L'amélioration du Maïs. pp. 79-127. Maroc. Direction de l'Agriculture du Commerce et des forêts. 1948. **524**

A translation of the article appeared in *Biological Reviews*, Vol. 21, pp. 101-20, 1946. [See *Herbage Abstracts* Vol. 16, Abstr. 1466, 1946.] —E.B.

OKLAHOMA Agricultural Experiment Station. Bull. No. 322. **Better oats for Oklahoma.** 1948. pp. 24. **525**

The bulletin describes, with illustrations, the value of oats for feeding and pasture. Description, performance and comparison of autumn and spring-sown oat varieties together with production practices including seed-bed preparation, place in crop rotation, rates and dates of seeding, use of certified seed, seed treatment and planting are given. Major breeding objectives of the Oklahoma oat improvement programme include ; higher and more stable grain yields ; grain of higher test weight, protein content, and of desirable appearance ; disease and insect resistance ; winterhardiness in winter oats ; drought, heat, lodging and shattering resistance.—K.O.

MÜNTZING, A. Några data från förädlingsarbetet med tetraploid råg och rågvete. [**Some data from breeding work with tetraploid rye and rye-Wheat.**] Report of N.J.F.'s Seventh Congress. 1947. Part II. 499-507. *Nord. Jordbrforsk*. 1948. 1-3. **526**

See *Plant Breeding Abstracts*.

BUTLER, F. C. **Stem rust of wheat. Value of resistant varieties.** *Agric. Gaz. N.S.W.* **59.** 511-4 and 520. 1948. **527**

This summary made in 1947-48, of the damage caused by stem rust of wheat, *Puccinia graminis tritici*, emphasizes the value of the rust-resistant varieties, Celebration, Charter, Gabo, Kendee and Yalta which have proved their ability to yield well under varying conditions. A map is given of the wheat zones of New South Wales and tables list the acreages and zones for which each of the 5 varieties is recommended. Attention should be given to time of planting, especially to the early maturing varieties liable to frost injury, such as Charter and Gabo. Celebration is recommended for early sowing and coastal districts and the late maturing variety, Febweb 1 (resistant to stem rust) for early sowing in some of the zones.—K.O.

SAGARMINAGA, R. C. Ensayos de variedades en trigo. [**Wheat variety trial.**] *Agric. tec. Chile* **8.** 5-27. [English summary, p. 27.] 1948. [Head of Cereals Section, Dept. Agric. Res., Min. Agric. Chile] **528**

Over one hundred varieties of wheat are at present under trial at the twelve agricultural experiment stations of the Chilean Ministry of Agriculture. The present article gives the results of trials made at the Ovalle and Los Andes Stations from 1940 to 1945 and at the Paine Station from 1941 to 1945. The three stations are situated in the Talca to Ovalle agricultural zone lying between latitudes 35°20'S. and 30°33'S. All the trials were made under irrigation. Fully tabulated data show the yields obtained in metric quintals per hectare, earliness, and the relative resistance of varieties to *Puccinia glumarum*, *P. triticina* and *P. graminis*. Varieties under trial for less than 3 years are not included. Correlation coefficients were calculated between resistance to *P. graminis* and the yield of each variety in each locality, and show that resistance to *P. graminis* is the most important factor affecting yield. Similar growing conditions exist in the three localities, although rust attack is more serious in the north. In general, the varieties

Capelli, Corazón, Santa Catalina and Granadero are those most satisfactory at Ovalle, and Capelli, Granadero and 38 M.A. at Los Andes and Paine. A new variety produced by the National Agricultural Society, Chile, under the name of Baflo, showed good regional adaptation but was only mediocre in yield.—G.M.R.

BERGSTROM, C. Kombinerade sort-och kvävegödslingsförsök med korn vid Sveriges Utsädesförening i Svalöf åren 1943-45. [**Combined variety and nitrogen dressing tests with barley at the Swedish Seed Association at Svalöf in 1943-45**] *Sverig. Utsädesfor. Tidskr.* **58.** **529**

Results verified the fact that dressings of easily soluble nitrogen fertilizers applied late during the vegetation period, increased the crude protein content of the grain. Calculating economic results, a small profit was obtained by 200 kg. per ha. saltpetre at sowing time and 200 kg. at the time of shooting. It is thought that this apparent profit will disappear in years in which rainfall is unfavourable to the effect of late dressing; in years with favourable rainfall the stiffness of the straw seems to be impaired by the late dressing. Volume weight and 1000-grain weight is somewhat decreased by the late dressing. Starch content decreases with increasing protein content.

Late dressings cannot be applied without some damage to the growing crop, a fact which has not been considered in the economic calculations, but which may be of some importance in practical farming. Dressings of 400 kg. at time of sowing seems the most reliable of the applications tested. —From English summary.

DAVE, B. B. **Manurial requirements of rice in the Central Provinces.** *Indian J. agric. Sci.* **17.** 245-60. 1947. **530**

Results of effects of fertilizers as organic and inorganic manures, on the yield of paddy rice, carried out at the Rice Research Station Raipur from 1935 to 1943. Experiments conducted on light (sandy loam) and heavy (clay loam) soils, show that highest yields and largest net profits, are obtained when nitrogenous and phosphatic manures in combination, are applied in the ratio of 1 : 1. Application of 20 lb. N_2 as $(NH_4)_2SO_4$ with 20 lb. P_2O_5 as double superphosphate per acre gives higher yields than either 20 lb. N_2 or 20 lb. P_2O_5 applied alone. But 20 lb. N_2 are better than 20 lb. P_2O_5 and 20 lb. P_2O_5 applied are better than no manure.

On very light (sandy) soils, P_2O_5 is the limiting factor. Application of 20 lb. P_2O_5 as 50 lb. double superphosphate per acre increased yields by 51 per cent. Applications of 20, 30, and 40 lb. P_2O_5 per acre produced no significantly different yields and neither did 40 lb. N_2 per acre.

Figures are given to illustrate the higher yield on heavier soils by application of nitrogenous fertilizers alone, or as mixtures of organic and inorganic nitrogen, over that obtained by farmyard manure applied on the same nitrogen basis. On light and heavy soils, application of nitrogen as compost, or as groundnut or sesamum cake increased yield considerably. Cultivators in the rice tract are also advised when and in what amounts to apply the various fertilizers.—K.O.

ASGHAR, A. G., and DHAWAN, C. L. **Effect of irrigation and growing rice on saline soils. 1. Manganese, nitrogen and phosphate status of soil.** *Indian J. agric. Sci.* **17.** 199-202. 1947. [Irrig. Res. Inst. Lahore] **531**

When land is reclaimed manganese is leached, nitrogen is lost because the nitrogen fixing organism is destroyed, and phosphorus is decreased in the soil. Success of reclamation depends on higher percolation but this is only accomplished by higher removal of phosphorus. To maintain fertility, manuring of soil after rice cultivation, with a leguminous crop, is necessary to provide the requisite nutrients.—K.O.

DRAGHETTI, A. Produrre molto grano. [**How to produce higher yields of wheat.**] *G. Agric. Domen.* **58.** 1. 1948. **532**

Increase in wheat yields during the last 25 years is due to the introduction of new early varieties with low culm, and also to the general practice, followed in north and central Italy, of winter nitrate manuring (calcium or sodium nitrates). With such treatment, thinning is reduced; the plants have in spring a vigorous restart, and are less sensitive to lodging, rust and premature ripening. With nitrate manuring, nitrogen and also oxygen are supplied, the latter often being deficient if plants are covered by ice or snow or have the roots in a soil saturated with water. Nitrates are easily leached from the soil, therefore manuring must be repeated; 30—40 kg. of nitrate per ha. after the middle of December, 30—40 in January, and 90—100 from 10th to 20th February. Manuring should take place before and not after a snowfall or cold periods. On very fertile soils, a higher winter manuring can be given, maintaining, also in this case, phosphatic manuring at the establishment.—E.B.

LO, I. Kornberging. Erfaring fra bruk av storkrake i høst. [**Harvesting of cereal crops (in Norway). Experience with the large drying pole in the autumn of 1948.**] *Norsk. Landbr.* **14.** 444-45. 1948. **533**

Drying of cereal crops on frames gives very good results, but makes great demands on labour and materials. During a severe storm in the autumn of 1948 a number of frames carrying unthreshed crops were razed to the ground, while on the writer's farm the large drying poles came through the test well. The workers preferred to use the large drying poles, and completed the work in a much shorter time than when frames were employed.—R.P.J.

AUSEMUS, E. R. **A machine for tying cereal nursery bundles.** *J. Amer. Soc. Agron.* **40.** 763-4. 1948. [Minnesota Agric. Exp. Sta.] **534**

This is used with the Jari mower. The tier is made from the tying mechanism from an ordinary binder. It is motor driven and mounted on a trailer. A wooden platform built to replace the binder platform is mounted on a spring so that it can be raised or lowered according to the size of the bundle to be tied. The grain is laid on the platform next to the bar which holds the grains and then the trip is released and the bundle is tied. A foot-treadle lever activates the tripping device, leaving the operator's hands free to handle the bundle. Recommended for harvesting rod-row trials.—K.J.S.

WHEAT, J. A., LESLIE, J. D., TOMKINS, R. V., MITTON, H. E., SCOTT, D. S., and LEDINGHAM, G. A. **Production and properties of 2,3-Butanediol. 28. Pilot plant recovery of *levo*-2,3- Butanediol from whole wheat mashes fermented by** *Aerobacillus polymyxa. Canad. J. Res.* **26.** 469-96. 1948. **535**

Whole wheat mash fermented by *Aerobacillus polymyxa* was stripped of ethanol, screened, and concentrated. The resulting syrup was passed through a steam stripping column, and the *levo*-2,3-butanediol in the condensate was recovered by rectification. The composition of intermediate materials and products, performance of pilot plant equipment, and data and recommendations for the design of a large scale plant are given. Corrosive conditions are indicated and possible materials of constructions suggested. A quantitative flow sheet and cost estimates for a commercial plant with a capacity of 1000 bu. of wheat a day are included. The daily output of such a plant is estimated to be 8460 lb. of diol (95.5 per cent recovery), 675 gal. of 95 per cent ethanol, 3900 lb. of dried bran, and 25,300 lb. of dried solubles. The initial cost of such a plant is estimated at $500,000. From estimates of raw materials and energy requirements the total cost of production of diol is calculated to be 17.3 cents per lb. when wheat costing $1.10 per bu. is fermented.—Author's abstract.

TOMKINS, R. V., SCOTT, D. S., and SIMPSON, F. J. **Production and properties of 2,3-Butanediol. 29. Pilot plant studies on fermentation of barley by** *Aerobacillus polymyxa* and **recovery of the products.** *Canad. J. Res.* **26.** 497-502. 1948. **536**

Barley mashes were successfully fermented by *Aerobacillus polymyxa* on a pilot plant scale. In the laboratory a 12.5 per cent mash appeared to be optimum but more concentrated mashes were efficiently fermented in the pilot plant. The hulls caused some mechanical difficulties, but these were overcome by eliminating right angle joints in the piping and by screening before recovery operations. Products were recovered by the same operations as for wheat. The lower raw material cost of barley resulted in an estimated reduction in the production cost of *levo*-2,3-butanediol of 7 per cent based on 1947 prices ; or a reduction of 10 per cent based on a long-term average for 1908-40.—Authors' abstract.

PENNSYLVANIA Agricultural Experiment Station. Bull. 496. **Costs and labour in harvesting corn grain and stover.** By *W. E. Keepper* and *S. A. Dum.* 1948. pp. 34. **537**

The trend in harvesting corn for grain and for stover in Pennsylvania, especially in recent years, has been toward the greater use of machinery and less use of man labour, the increasing cost of the latter being an important factor. This study shows that Pennsylvania farmers harvested an average of 12.6 bu. shelled corn basis per hour of man labour when the mechanical corn picker method was used, as compared with 3.2 and 2.4 bu. respectively when ears were husked by hand from the standing stalk or from shocked fodder.

When a mechanical picker was used, the saving of stover for feed and bedding was impractical. Of the three methods used by which grain and stover were harvested, the husker-shredder method required the least labour per acre, 17.0 hours and the lowest cost, $20.02. Wide variation in costs and labour inputs occurred among farmers using any one of the methods, but the following practices helped the more efficient users of each method in obtaining low labour inputs and costs per bushel of grain or per ton of stover.

(1) Reducing the number of times the stover and the grain were handled between standing corn and storage.

(2) Using corn binders and husker-shredder co-operatively.

(3) Hiring rather than purchasing a mechanical picker when the acreage of corn to be harvested was small and vice versa.

(4) Using portable elevators.—T.G.J.

NEETHLING, J. C. **Maize production costs.** *Fmg S. Afr.* **23.** 371-9. 1948. **538**

The investigation relates to farms in the Transvaal Highveld and North-western Orange Free State. Crops form the most important source of income, and maize is by far the most important crop. It accounted for 38.8 per cent of the total (1945/6 and 1946/7, 2-year average) in the Transvaal Highveld and 50.9 per cent for the same period in north-western Orange Free State.

Costs per morgen are much lower in the Orange Free State than in the Transvaal Highveld mainly because cultivation costs are considerably lower. Only 5.16 days per morgen of maize are required in the former compared with 9.14 days in the latter state. Yield of maize per morgen is the main factor which influences costs, and a graphical illustration of this is given. In 1946/47 the yield per morgen in the Transvaal Highveld was 11.2 bags and in north-western Orange Free State 6.7 bags.—T.G.J.

UNITED STATES, Department of Agriculture, Agricultural Research Administration, Bureau of Agricultural and Industrial Chemistry. ACE-191, Suppl. 2. **Chemical changes in stored grains. A selected and annotated bibliography.** 1948. pp. 9. **539**

JACOBSEN, H. G. M. **A technique for introducing radioactive phosphorus into the grain of growing corn.** *Plant Physiol.* **23.** 636-7. 1948. [Connecticut Agric. Exp. Sta.] **540**

The nutrient solutions were replaced with tap water on May 5th, when the maize was in the early milk stage of kernel production, and 166.25 millicuries of P in the form of KH_2PO_4 were added to the water of each culture solution. Requisite amounts of N, K and P were added at dates up to May 27th but not afterwards. The mature grain had the highest resulting radio-activity and was suitable for use in a poultry feeding experiment.—K.J.S.

BREESE, M. H. **The storage of maize and pulse crops. Part 1.** *Nyasaland Quart. Agric. J.* **7.** 55-8. 1948. **541**

The best methods of grain and pulse storage are expounded, and precautionary and inexpensive measures to prevent and limit the infestation of these crops by weevils and other insects, before and during storage, are put forward.—J.T.B.

LARTER, L. N. H. **Maize seed storage.** *Trop. Agric. Trin.* **24.** 40-44. 1947. [Dept. Agric., Jamaica] **542**

A series of experiments are described on the storage in bags of shelled corn seed previously treated with the following substances: kaolin, hydrated lime, ignited bauxite, Agrosan, calcined alumina, mercury vapour and Gammexane in two concentrations. Records of the increase in population of the weevil, *Calandra oryzae* L., and loss of viability are analysed and compared.

Under exceptional climatic conditions, probably related to high air humidity, none of the treatments gave satisfactory weevil control. Under normal to dry climatic conditions various degrees of control were obtained and treatment with Gammexane or calcined alumina (Alkalox) provided satisfactory control of weevils and maintenance of viability for most commercial purposes. Lines along which further investigations might proceed and provisional recommendations regarding storage methods are made.—Author's summary.

DONÀ Dalle ROSE, A. Disinfestazione e germinazione del frumento da seme. [**Disinfestation and germination of wheat seed.**] *Ann. Sper. agrar.* **2.** 693-700. [English summary, p. 700] 1948. [Roma, Stazione chimico-agraria sperimentale] **543**

Seeds of *Triticum sativum* var. Mentana treated with different doses of DDT powder for prevention against parasites—in the condition of the experiment—have shown no reduction in germinability and germinative power. No depression was observed in the first vegetative stages but, on the contrary, a slight stimulation.—E.B.

DONÀ dalle ROSE, A. Sul trattemento alle cariossidi di frumento con un fitormone sintetico. [**On the treatment of wheat grains with a synthetic phytohormone.**] *Ital. agric.* **85.** 736-9. 1948. **544**

Wheat grains of the var. Mentana have been treated experimentally with " Rootone." As a conclusion, it is thought that concentrations between 1 and 2 parts per thousand should be capable, in practice, of favouring the first stages of plant development, with a positive effect on yields.—E.B.

OKLAHOMA Agricultural Experiment Station. Tech. Bull. No. T-32. **Seasonal history of the Southwestern corn borer** *Diartraea grandiosella* **Dyar in Oklahoma; and experiments on methods of control.** By *R. R. Walton* and *G. A. Bieberdorf.* 1948. pp. 23. **545**

The South-western corn borer, *Diatraea grandiosella* Dyar, though a native of Mexico, has recently caused serious damage to corn in Ohlahoma and parts of Kansas.

In 1942 reduction in corn yields by borer injury, ranged from 8.7 per cent to 100 per cent depending on the intensity of infestation and stage of development of the plants when attacked. Corn planted before May 15th sustained much less damage than later plantings. Listers, one-way disks and buzzard wing sweeps were the most effective tools used for uprooting stubble to kill hibernating borers. Ploughing under stubble to a depth of 4 in. or more was effective in preventing the emergence of moths. Results show the stubble should be uprooted not later than early February to secure effective kills of borers. Six insecticides, applied as sprays and dusts, were generally ineffective in controlling borers during the growing season.

The percentage of winter mortality was higher and infestation lower in silt or clay soils than in sandy soils, and records from 14 areas show a general decline in infestation during 1946 and 1947. —From Author's Summary.

LARTER, L. N. H. **Maize population yield in Jamaica.** *Trop. Agric. Trin.* **24.** 19-27. 1947. [Dept. Agric., Jamaica] **546**

It is shown by population counts of commercial corn fields in Jamaica that the average stand at harvest is of the order of 50 per cent.

Experimentation reveals that depopulation is due partly to pests, especially rodents, attacking newly sown seed (up to 36 per cent loss), *Laphygma frugiperda* and heart rot (up to 45 per cent) attacking the young plants and a complex of undiagnosed diseases killing older plants and rendering them barren (up to 25 per cent). Of these causes of loss only army worm is subject to efficient control in commercial practice. Thorough investigation of the disease situation is obviously necessary and effective seed treatment and pest control at planting is required. Tarring seed has proved useful in the last connexion. Losses from depopulation can be largely offset by overseeding and thinning. By relatively inexpensive improvements in seed-bed preparation and planting, over 100 per cent increase in grain yield can be obtained, and it is inferred that proper attention to other aspects of cultivation should result in very large yield increases.—From Author's summary.

STANTON, T. R. **The present status of southern oat improvement.** *J. Amer. Soc. Agron.* **40.** 751-7. 1948. [Div. Cereal Crops and Diseases, Bur. Plant Indust., Soils and Agric. Engng, Agric. Res. Admin. U.S. Dept. Agric.] **547**

This report deals with changes in current oat breeding programmes necessitated by the occurrence in epidemic proportions, of Victoria blight, *Helminthosporium victoriae* in the Southern United States.

All varieties resistant to crown rust and smut, derived from crosses of Victoria oats are susceptible to Victoria blight and the only two southern varieties resistant to crown rust and Victoria blight are Camellia and Florida 167, both derived from crosses of Bond. Red Rustproof and Fulghum strains and old and new varieties of hardy common and red oats grown in the so-called common winter oat area are resistant.

Breeding work is in progress for resistance to stem rust, smuts, mosaic, leaf and glume blotch and for better forage and pasture oats with stiff straw of good quality and yield. See also *Plant Breeding Abstracts*.—K.O.

MASILAMANI, S. G., and RAMOO, H. **Experiments on green manure crop culture as a measure of control of** ***A. culicifacies*** **breeding in paddy fields.** *Indian J. agric. Sci.* **16.** 492-500. 1947. [Vepery, Madras, S. India (S.G.M.) and Reg. Malaria Organization, Pattukottai (H.R.)] **548**

The report of a scheme for experimental control of rural malaria in the Grand Anicut Canal area of Pattukottai *taluk*, Tanjore District, Southern India.

Previous work shows that *A. culicifacies* is a poor vector and becomes important only because of its density of prevalence—hence control of its breeding would prevent the spread of malaria.

Results show that leguminous green crops, e.g. Kolingi (*Tephrosia purpurea*), Daincha (*Sesbania aculeata*), and Sunnhemp (*Crotalaria juncea*) not only increase the yield of paddy, but also—by their habit of growth—create conditions in the field which inhibit the breeding of *A. culicifacies*.

It is suggested that methods like green crop culture as malarial control measures, will finally become part of the ryot's agricultural budget and as there is continuous control of breeding of *A. culicifacies* from the time water is let into rice fields till the time when the height of paddy growth itself is sufficient to prevent oviposition, under this system, malaria will finally die out.—K.O.

JONES, D. P. **Insect and other pests of wheat.** *Fmg* **2.** 311-4. 1948. **549**

The life histories of some of the more important pests of wheat are examined. In the case of the Wheat Bulb Fly, owing to the nature of the life history, fallow or semi-fallow conditions in the critical period must be avoided, and the drilling of the wheat must be performed either before the end of October, or early in March, while partial control of the Wheat Shoot Beetle attack can also be obtained by early sowing of autumn wheat.

Wireworm damage can be largely reduced by eliminating permanent grassland, and by ensuring thorough seed-bed preparations. Attention must be given to time, manurial and phosphate requirements, and rapid growth and tillering encouraged. Insecticides, particularly B.H.C., are also valuable counteracts of wireworms. Frit Fly injury to wheat may be avoided if ryegrass leys are ploughed early in July or August. Other insect and non-insect pests such as the Grey Field Slug, are discussed, and on the whole, the best control methods are clean seed and the use of insecticides. Cultural measures, emphasising the correct times of sowing, ploughing practices, rotations, soil consolidation, and judicious use of fertilizers are stressed.—J.T.B.

GARRETT, S. D., and MANN, H. H. **Soil conditions and the take-all disease of wheat. 10. Control of the disease under continuous cultivation of a spring-sown cereal.** *Ann. appl. Biol.* **35.** 435-42. 1948. [Rothamsted Expt. Sta., Harpenden, Herts., (S.D.G.) and Woburn Expt. Sta., Husborne Crawley, Bletchley, (H.H.M.).] **550**

In a field experiment on the control of take-all at the Woburn Experimental Station, winter wheat was followed by two consecutive crops of spring-sown barley. Samples of the barley crop were taken from the forty-eight plots of the experiment in 1945 and 1946, for estimation of root disease rating, and grain yields were also recorded. A comparison of six autumn treatments of the stubble has shown that treatments affecting the available nitrogen content of the soil exercised a predominant effect upon incidence of take-all in the following crop. Two effects of nitrogen applied in autumn have been distinguished: (1) an immediate effect, in assisting survival of *Ophiobolus graminis* in infected root and stubble residues; (2) a deferred effect in promoting disease escape of the following crop. The ploughing-in of straw in autumn was found to increase the incidence of take-all, presumably because the adverse deferred effect of decomposing straw in locking up available nitrogen and withholding it from the following crop outweighed its beneficial immediate effect in helping to starve out *O. graminis*, by depriving the fungus of nitrogen. The autumn growth of undersown trefoil (*Medicago lupulina*) on the stubble land seemed to be entirely beneficial; active growth of the legume appeared to assist in starving out *O. graminis* and nitrogen was released by decomposition of the trefoil in the soil after spring ploughing in time to benefit the barley crop immediately following.—Authors' summary.

GRASSO, V. Le specie di *Tilletia* del frumento esistenti in Italia e loro distribuzione geografica. [**Species of *Tilletia* of wheat existing in Italy and their geographical distribution.**] *Ann. Sper. agrar.* **2.** 525-47. [English summary, pp. 546-7] 1948. **551**

Although in Italy bunt of wheat can be controlled by anticryptogamic treatment or by other devices, the author is of the opinion that it would be advisable to select resistant varieties in order to reach definite results.—E.B.

BECKLEY, V. A. **Protection of grain against weevils.** *E. Afr. agric. J.* **14.** 71-6. 1948. [Sci. Adviser, Pyrethrum Bd., Kenya] **552**

Temperate climate methods of fumigation and disinfection of wheat are not applicable in East Africa; direct application of insecticides to grain appears to be the only solution. DDT and Gammexane may only be used in minor quantities on grain intended for human consumption.

The report describes 6 treatments carried out in September, 1947, to test the efficacy of pyrethrum powder and dusts against pests particularly weevils, *Calandra oryzae* on wheat and maize. All the pyrethrum treatments gave excellent to complete protection for 8.5 months. Differences in value of treated and untreated grain more than compensated for the cost of treatment. It is suggested that if all grain were treated with pyrethrum powder, the weevil would be reduced to only a minor nuisance.—K.O.

FOX, W. B. **2, 4-D as a factor in increasing wireworm damage of wheat.** *Sci. Agric.* **28.** 423-4. 1948. [Dominion Entomol. Lab., Sask.] **553**

Crop damage by the prairie grain wireworm, *Clenicera aeripennis destructor* is more severe if seed germination or early growth is retarded. Evidence is presented that 30 per cent of emerged plants of wheat sown on May 16 on plots sprayed May 15 with 2, 4-D at the rate of 1 lb. per acre were killed by wireworm as compared with 5 per cent on control plots. Wheat sown on June 17th was affected to a less degree. Caution should be exercised in applying 2, 4-D shortly before seeding wireworm-infested land.—K.J.S.

ARGENTINE REPUBLIC, Ministerio de Agricultura, División de Inmunologia Vegetal Hoja Inform. No. 8. Informaciones de interés para los trabajos de selección de plantas resistentes a la carie. [**Information of interest for the selection of plants resistant to *Tilletia caries*.**] 1948. pp. 2. **554**

Tilletia caries and *T. foetida* cause damage of importance in the wheat-growing regions of Argentina and especially in the south of Buenos Aires, La Pampa and part of Cordoba. *Triticum vulgare* is more susceptible to infection than *T. durum*. A list of wheats commonly grown in Argentina is presented, with notes on their behavior under inoculation with *Tilletia* species.—G.M.R.

ARGENTINE REPUBLIC, Ministerio de Agricultura, División de Inmunologia Vegetal Hoja Inform. No. 9. Informaciones de interés para los trabajos de selección de plantas resistentes a *Ustilago tritici*. [**Information of interest for the selection of plants resistant to *Ustilago tritici*.**] 1948. pp. 2. **555**

Ustilago tritici is found in all parts of the wheat-growing area of Argentina, but especially in the hotter and moister parts. Inoculation trials have shown the following varieties of *Triticum vulgare* to be immune or very resistant: Chino 466 and its descendants 38 M.A. and Sinvalocho M.A., together with some foreign varieties. Most varieties of *T. durum* are resistant, Acme, Kubanka (Beloturka) and Pentad especially so. Many varieties of *T. vulgare* are more or less resistant, and the following combine with this character resistance to other diseases also: Axminster, H.44, Hope, N.A. 95 Egypt, Normandie, Kanred, and Warigo.—G.M.R.

BONNETT, O. T. **Ear and tassel development in maize.** *Ann. Mo. bot. Gdn* **35.** 269-87. 1948. **556**

The corn shoot passes through two developmental phases from the time of germination to the dehiscence of the anthers; (a) the production of leaf fundaments, leaves, and axillary shoots, while the stem internodes remain short; (b) the stem internodes elongate, the tassel, ear and their parts differentiate and develop, and the axillary shoot or shoots pass through their various stages of development. Both these phases are described in detail, ear types are discussed, and some deviations from normal development considered, such as the occurrence of functional pistils in the tassel. The description is illustrated by numerous photomicrographs.—T.D.H.

STEPHENS, S. G. **A comparative developmental study of a dwarf mutant in maize, and its bearing on the interpretation of tassel and ear structure.** *Ann. Mo. bot. Gdn* **35.** 289-99. 1948. **557**

A better understanding of the general developmental plan in the maize plant might furnish a new line of attack in interpreting the particular morphology of the inflorescence. Studies of the inflorescence alone neglect valuable informatory sources. Adopting the former principle, the problem of ear and tassel homologies involves three ontogenetic questions: (1) Is the reduction of lateral branches (to give paired spikelets) peculiar to the tassel or is it the culmination of a process initiated during the vegetative phase? (2) By what developmental process is the simple alternate arrangement of primordia as seen in the basal vegetative portion of the shoot, transformed into the polystichous arrangement found in the apical reproductive region? (3) The florets of ear and tassel being both potentially hermaphrodite, what are the factors determining whether the anthers or the pistil will degenerate? It was believed that studies of a dwarf mutant and its normal sib, have some bearing on the interpretation of tassel and ear morphology.

This study suggests that the dwarfing gene, (a) increases the production of nodes and associated axillary structures; (b) reduces internode, leaf, and leaf sheath lengths; (c) retards axillary ear production so that the sterile zone between the uppermost ear-bearing nodes and the lowest tassel branches, tends to be eliminated. Under certain conditions the axillary branches in the dwarf mutant exhibit a graded series, ranging from normal ear to paired male spikelets. Within this series three main tendencies are evident. Firstly there is a progressive reduction in number and size of the lateral organs borne by the axillary branches in passing from base to apex of the main axis. Secondly, there is a progressive condensation of nodes from base to apex both in the tassel and in the shank. Lastly there is an association between degree of condensation and femaleness, the greater the condensation of a node the more does it tend to bear female spikelets. These tendencies are discussed in relation to the ontogenetic questions mentioned earlier.—T.D.H.

CUTLER, H. C., and CUTLER, Marian C. **Studies on the structure of the maize plant.** *Ann. Mo. bot. Gdn* **35.** 301-16. 1948. **558**

The maize plant is composed of a number of similar units, "phytomers," each consisting of an axillary bud at its lower end, a section of the stem, and is terminated by a leaf. Because of this repetition of plant pattern, some organs which are not strictly homologous will reflect changes in other parts. Some homologies of the parts in maize, teosinte, *Tripsacum* and *Manisuris* are discussed.—T.D.H.

WEATHERWAX, P. **Right-handed and left-handed corn embryos.** *Ann. Mo. bot. Gdn* **35.** 317-21. 1948. **559**

The shoot of the maize plant is described as furnishing an example of *antidromy*. Every grass plant must start out in life as either a "left-handed," or "right-handed" plant, as determined by the direction of overlap of the first foliage leaf.

Macloskie (Bull. Torrey Bot. Club 22: 379-387. 1895) infers that of each pair of rows of grains in the maize ear, the embryo on the left will produce a sinistral plant, while that on the right will produce a dextral plant. The author finds this statement to be inaccurate, the type of embryo being determined solely by chance.—T.D.H.

ANDERSON, E., and BROWN, W. L. **A morphological analysis of row number in maize.** *Ann. Mo. bot. Gdn* **35.** 323-36. 1948. **560**

Row number is studied both in the ear and tassel of maize and is seen to be affected by two main variables, "condensation" and whorling. Condensation is related to row number by the equation $C = 10R$, a relationship that fails to hold in the United States above 20 rows, probably due to the intense selection in the past against varieties with more than twenty rows. The genetics of row number is not a case of simple monofactorial, but of multiple factorial inheritance.—T.D.H.

LAUBENGAYER, R. A. **The vascular anatomy of the four-rowed ear of corn.** *Ann. Mo. bot. Gdn* **35.** 337-40. 1948. **561**

The anatomical structure of the four-rowed ear is very similar to that of the eight-rowed. There are present two distinct systems of vascular tissue which probably differentiate at the base of the ear. As in the eight-rowed ear the more strongly developed inner system supplies the paired spikelets, while the outer system, which is more strongly developed than in the eight-rowed ear supplies the lower glumes. The total bundle supply is greater than in the eight-rowed ear, though some bundles, those on the sides not bearing spikelets, do not enter into the spikelet supply. This existence of a large amount of vascular tissue associated with a small total mass suggests the four-rowed ear to be a reduced type, as the vascular systems are more conservative and less liable to respond to changed conditions. If this is true in the four-rowed ears, it may be that similar reductions occur in the higher-rowed forms, a possibility which might necessitate a general change in the interpretation of the row number of the corn ear.—T.D.H.

PRAT, H. **General features of the epidermis in *Zea mays*.** *Ann. Mo. bot. Gdn* **35.** 341-51. 1948. **562**

A study of the epidermis of maize, giving descriptions of the various types of cells and their distribution, as a means of classification.—T.D.H.

LENTZ, L. W. **Comparative histology of the female inflorescence of *Zea mays*.** *Ann. Mo. bot. Gdn* **35.** 353-76. 1948. **563**

The need of a histological study of the corn cob is discussed. A modified celloidin technique used in the preparation of thin sections of mature cobs, both of recent and archaeological material, is described in detail. Three characters were found to vary greatly between the different varieties; the rachis-flaps, length and shape of the pedicels, and the amount and distribution of sclerenchyma. The topography and anatomy of the cobs are discussed.—T.D.H.

PORTÈRES, R. Glumes vestigiales externes dans le genre *Oryza* et position systématique de la tribu des Oryzées. [**Empty outer glumes in the genus *Oryza* and systematic position of the *Oryzeae* tribe.**] *Rev. Bot. appl.* **28.** 339-43. 1948. **564**

The literature on the subject is reviewed and discussed.—E.B.

HEDLUND, T. Om stråsädens näringsupptagande med särskild hänsyn till gråfläcksjukans orsak. [**Nutrient absorption of cereal plants with special reference to the causes of grey speck disease.**] 1948. pp. 90. [German summary, pp. 83-8.] **565**

In Chapter 1 a brief survey is given of the nutrient absorption of cereal plants and in Chapter 2 the methods of investigation are described. Chapter 3 deals with the conversion of substances in the roots on their absorption, and Chapter 4 with bicarbonate injury in the leaves. In the final chapter the primary causes of grey speck disease of oats are discussed.

The chief cause of grey speck disease is as already established by J. Sachs the occurrence of iron as ferric phosphate. This iron compound has on some plants in varying degree an unfavourable influence which consists in the sugar conduction in the plant both upward and downward being retarded. The injuries caused by the disease are in a high degree dependent on the weather.

In what way the ferric phosphate has an inhibiting effect on sugar conduction could not be easily determined through the investigations. The experiments certainly showed that this unfavourable effect is always present even when the plants are kept protected from bicarbonate injury. When the temperature of the nutrient solutions during the experiments is so high that these injuries do not appear, the harmful effect of the ferric phosphate is nevertheless manifested in a slower development. It also becomes evident that the effect of the ferric phosphate is considerably reduced by the addition of an equally large amount of ferric hydroxide.—R.P.J.

DUFRÉNOY, J. Physiologie des plantules de riz. [**Physiology of rice seedlings.**] *Rev. Bot. appl.* **28.** 365-6. 1948. **566**

Rice yields depend to a large extent on the soluble sulphates or other forms of assimilable sulphur contained in the soil. The author has carried out laboratory trials on seeds of the "Calora" variety in order to study the effect of dithiobiuret. This compound was employed at increasing doses (from 0.17 to 50 mg. per litre). During the first days even the smallest doses have proved to retard germination, but afterwards the leaves developed much quicker with solutions containing from 12.5 to 25 mg. of dithiobiuret per litre.—E.B.

EKBOTE, R. B., and DHANNALAL. **The effect of frost on different wheat varieties sown at intervals.** *Indian J. agric. Sci.* **17.** 299-300. 1947. **567**

Experiments on the effect of frost damage to crops, showed that effect of time of sowing was not significant, whereas differences in varietal resistance were clearly perceptible.—K.O.

МИРОШНИЧЕНКО, К. Г. Обмен углеводов у яровых пшениц в фазе колошения в условиях почвенной засухи. (К вопросу о физиологии критического периода у злаков). *Доклады Акад. Наук СССР* Том 59. *No.* 9. стр. 1653-6. 1948.

MIROŠNIČENKO, K. G. [**Exchange of carbohydrates in spring wheats at the earing stage under dry soil conditions. (Physiology of the critical period in cereals.)**] *Doklady Akad. Nauk SSSR.* **59.** 1653-6. 1948. [Lab. Pl. Physiol., Lesgaft Nat. Sci. Inst., Leningrad] **568**

At the earing stage the plant has completed growth and differentiation of its reproductive organs, and the products of assimilation are stored as reserves in the endosperm from where carbohydrates should be transported and converted for use. Any disturbance of these normal processes under the influence of drought at this period has great effect on yield. Study has been made with two varieties of spring wheat (Garnet, susceptible to drought, and Lutescens 1467, resistant to drought) in which were determined the monosaccharides, saccharose, starch and hemicelluloses in the roots, stems, leaves and ears. The samples for analysis were taken at the time of discontinuing watering (16 July) and then 5 and 7 days later (21 and 23 July) when the soil moisture decreased to 30-35 per cent of full moisture content. The final sample (control) was taken on 31 July.

The following table indicates the dynamics of sugars and starch in plants of the control series grown in normal moisture conditions (in mg. per grm. dry matter) :

		Garnet, sampled on :		Lutescens, sampled on :	
		16/7 and	31/7	16/7 and	31/7
Mono-saccharides	root	12.5	17.0	12.5	13.5
	stem	23.0	17.5	17.0	20.5
	leaf	38.5	32.0	54.5	33.0
	ear	122.5	36.5	122.5	30.0
Saccharose	root	10.3	42.4	8.8	29.0
	stem	56.7	107.4	35.0	122.5
	leaf	98.8	148.0	66.5	68.0
	ear	67.5	129.7	40.5	99.5
Starch	ear	40.0	129.4	40.5	176.5

The second table indicates the amount of increase or decrease of sugars and starch in the plant organs after discontinuing watering (in mg. per grm dry matter) :

	Monosugars		Saccharose		Starch	
	21/7	23/7	21/7	23/7	21/7	23/7
Garnet :						
root	+ 3.5	+ 4.5	−16.2	− 22.0	+18.8	+12.1
stem	+20.5	+25.5	−29.2	− 9.3	−22.2	−36.7
leaf	+16.0	+15.0	−24.7	− 23.8		
ear	+13.5	− 6.5	+17.7	+ 17.0	+ 5.2	+ 9.4
Total veget. organs	+40.0	+45.0	−70.1	− 55.1		
Lutescens :						
root	+ 3.3	+5.5	−13.2	− 29.7	+ 7.6	+17.5
stem	+14.5	+15.0	− 1.7	− 53.0	−15.7	−37.5
leaf	+ 7.5	+ 6.0	− 5.8	− 20.0		
ear	−16.0	+12.0	+38.0	+ 21.5	+50.5	+32.7
Total veget. organs	+24.8	+26.5	−20.7	−102.7		

The significance of the data is discussed in some detail in regard to the capacity of the two wheat varieties to withstand drought conditions. The resistant variety Lutescens is characterized by a greater energy of carbohydrate exchange which is testified by a greater starch accumulation, a less content (compared with Garnet) of monosaccharides in stems and leaves at the end of the earing stage, and a higher content in the ears of saccharose. A stimulation of carbohydrate exchange at earing is connected with an increased rate of development of the plant under conditions of insufficient soil moisture.—M.H.

СИСАКЯН, Н. М. и ВЕРХОВЦЕВА, Т. П. Последействие различных температур на адсорбцию инвертазы тканями высших растений. *Доклады Акад. Наук СССР.* Том 59. *No.* 1. стр. 107-9. 1948.

SISAKJAN, N. M. and VERHOVCEVA, T. P. [**The after-effect of different temperatures on adsorption of invertase by tissues of higher plants.**] *Doklady Akad. Nauk SSSR.* **59.** 107-9. 1948. [Biochem. Inst., Acad. Sci. USSR.] **569**

Many researches have demonstrated that the capacity for adsorption by living plant cells exposed to the influence of fluctuations in seasonal and daily factors, varies under the effect of narcotics, of desiccation, osmotic pressure and mineral substances. Adsorption capacity varies also depending on the physiological function of the organs and tissues of the plant. There is an increasing amount of evidence indicating the connexion between adsorption of enzymes by plant tissues and the direction of ferment activity. It has been shown that the formation of ferments and the breaking up of carbohydrates and proteins in living plant cells are subject to great fluctuation under the influence of temperature, and that resistance of the plant to cold is also a determining factor. The authors have studied experimentally the character of the changes which arise in adsorptive capacity of plant tissues under different temperatures with two varieties of winter wheat from the Institute of Grain Husbandry. There is evidence that lowering temperature from 30°C. to −30°C. is accompanied by a greater adsorptive capacity of the tissues in winter wheat seedlings, apparently because of a protective reaction of the protoplasm when affected by temperature. An increase of osmotic pressure strengthens adsorptive capacity of the cells, especially under low temperature.

A strengthening of ferment adsorption under the influence of osmotic pressure in low temperatures is accompanied by activation of saccharose synthesis and a weakening of saccharose hydrolysis. —M.H.

MARTINEZ, L. R. Influencia de la harmina en el crecimiento de plantulas de trigo. [**Influence of harmine on the growth of wheat seedlings.**] *An. Inst. esp. Edaf. Ecol. Fisiol. veg.* **7.** 343-55. 1948. **570**

The action of harmine, an alkaloid of *Peganum Harmala*, on wheat seedlings consists first in inhibition of growth, then in increase and lastly in inhibition, which may bring levelling with the control. Both inhibition and increase of growth are accentuated as the concentration of harmine in the solution, and the temperature, increase. The root appears to be the more susceptible part of the plant. Partial elimination of the alkaloid through leaching from *P. Harmala* causes stimulation in growth in the plant itself. Hypotheses are made on the mechanism of this influence.—E.B.

KEMPTHORNE, O., SCHMIDT, J. L., and SNEDECOR, G. W. **The estimation of yield of corn of standard moisture content in hybrid seed corn production.** *J. Amer. Soc. Agron.* **40.** 645-54. 1948. [Iowa St. Coll. Ames] **571**

In order to examine the relationship between moisture content and lb. per bushel or bushels per 1000 lb. and to suggest other and more convenient methods of estimating the desired characteristic, a co-operative project was established between Iowa Agricultural Experiment Station and the Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture. Necessary equipment and hybrid seed corn for the test were supplied by a local firm of seed producers.

Detailed descriptions of experimental procedure and the results obtained in sampling and estimating the character are presented and results showed that observations of shelling percentage on a small number of samples in addition to the determination of the moisture content of the kernels may be used to give estimates of greater precision than estimates based on observations of moisture content of kernels alone.—K.O.

ERICKSON, L. C., SEELY, C. I., and KLAGES, K. H. **Effect of 2,4-D upon the protein content of wheats.** *J. Amer. Soc. Agron.* **40.** 659-60. 1948. [Idaho Agric. Exp. Sta.] **572**

In Idaho stunting of wheat was produced whenever dosages of 2,4-D were large enough to kill sensitive annual weeds. Larger doses of 2,4-D produced greater stunting indicating this substance was capable of altering wheat morphologically, physiologically and physio-chemically. Studies are now being made to determine physiological effects on weeds and histological effects on other weeds and crops.

Protein content of wheat varieties increased in direct relation to the amount of 2,4-D used, whether or not weeds were present in the crop, and regardless of decreases or increases in straw yield. Experimental work on the effect of protein content of wheat by 2,4-D is still in progress but results to date indicate the possibilities of using this substance to alter the composition of crops to fit specific needs.—K.O.

MARTH, P. C., TOOLE, E. H., and TOOLE, V. K. **Effect of 2,4-dichlorophenoxyacetic acid on seed development and germination in certain cereal and grass crops.** *J. Amer. Soc. Agron.* **40.** 916-8. 1948. [Agric. Res. Adm., U.S. Dept. Agric., Beltsville, Md] **573**

It was reported that seeds of Kentucky bluegrass and timothy produced by plants treated with the herbicide 2,4-D germinated as well as seed from untreated plants. In these earlier experiments, 2,4-D was applied once well before seed maturation and the germinability of the seeds was not affected. It is possible, however, that when applied to seeds approaching maturity 2,4-D may enter the developing seed and cause injury.

This report concerns the germination of ryegrass, rye and oat seeds of plants treated during various stages of seed development. Results are also presented of germination tests with wheat and rye seeds produced by plants grown on soil treated with 2,4-D.

The tests of ryegrass, oats and rye seeds from plots treated at varying stages of development, showed no statistically significant differences in germination as a result of the treatments. In the tests with rye seeds, poor development of the seeds from treated and untreated plots would make it desirable to conduct further trials under weather conditions more suitable to rye seed development. Germination results of wheat and rye grown on plots having different rates of application of 2,4-D to the soil, were obviously influenced by outside factors, hence results were not given in detail.

From this study there is no evidence that spray treatment of growing ryegrass, oats and rye with 2,4-D solution at 1000 p.p.m. (approx. 1.7 lb. per acre) had any detrimental effect on the germination of the sound seed produced or on the vigour of seedlings, even when the treatment was applied as the seed matured. In this work only the acid form of 2,4-D was used. It is possible that different results would be obtained if 2,4-D were applied in the form of the salt, ester or amide.—K.O.

КУРЦ, Ф. А. О причинах понижения всхожести семян при их прогревании и путях восстановления всхожести. *Доклады Акад. Наук СССР* Том 58. *No.* 6. стр. 1201-2. 1947.

KURC, F. A. [**The causes of lowered germination of seed as a result of heating, and means of restoring germination capacity.**] *Doklady Akad. Nauk SSSR.* **58.** 1201-2. 1947. [Biol. Inst., Ural Filial Acad. Sci. USSR, Sverdlovsk] **574**

Tests made with wheat grain have shown that heating lowers germination capacity and results in a large percentage of abnormal seedlings. Moistening the seed under optimal temperature for a definite time increases germination and lowers the percentage of abnormal seedlings.

Heating also lowers catalase activity, but subsequent treatment restores it. This supports the view of Kostyčev (Physiology of Plants, 1924) regarding the regenerative capacity of ferments.

There is evidence from field tests that high temperature (100°C.) does not kill the embryo but only depresses its activity temporarily.—M.H.

TIBERG, S. Synpunkter beträffande höstvetets groningsomognad. [**Views concerning "germination unripeness" of autumn wheat.**] *Svensk Frötidn.* **17.** 123-5. 1948. **575**

Farmers are advised after a wet, cold and sunless summer not to sow autumn wheat which has not been well dried. The moisture content of the seed grain purchased from the larger seed firms has as a rule been so much reduced artificially that any risk of "germination unripeness" does not occur.—R.P.J.

LACHIONDO, F. B., and LOPEZ, A. C. Contribución al estudio de la influencia de los antibióticos en la germinación de las semillas. [**Contribution to the study of the influence of antibiotics on seed germination.**] *An. Jardin bot. Madr.* **7.** 1946. 177-96. [English summary, pp. 189-90] 1947. **576**

This study has been carried out on seeds of *Triticum vulgare* var. *lutescens*, and other plants.

Crystalline potassium salt of penicillin G does not inhibit seed germination at concentrations from 0.1 up to 2,000 i.u. per cubic centimetre. Amorphous calcium and sodium salts of penicillin contain factors that inhibit seed germination. By rendering inactive with penicillase the penicillin contained in these amorphous salts, the inhibitory power on seed germination still remains: this shows that the inhibitory factors are substances other than penicillin. The inhibition obtained is similar to that obtained with solutions of phenyl-acetic or indol-3-acetic acids. Crystalline potassium salt of penicillin G has no action on the inhibitory power of phenyl-acetic and indol-3-acetic acids on seed germination. The auxins present in a sample of amorphous calcium penicillin have been estimated by the "avena test" and it was found that 100,000 i.u of the sample contained 0.1 mg. of indol-3-acetic acid. The inhibitory factors contained in one million units of calcium penicillin have the same power as 100 mg. of indol-3-acetic acid. The indol-3-acetic acid is therefore about 1 per cent of the inhibitory factors among which, it is thought phenyl-acetic acid is the principal component.

Patulin inhibits seed germination and the degree of inhibition is proportional to the concentration.

Cysteine at the concentration of 5 grm. in 10,000 cubic centimetres of distillate water has some inhibitory action on germination of *Raphanus* seeds, and at the concentration of 2.5 grm. when its inhibitory action is very small cysteine antagonizes the inhibitory action of a solution of patulin of the same concentration.

There is a synergism between patulin and furacin in relation to their inhibitory action on seed germination of *Lactuca sativa* var. *capitata*.—From authors' summary.

MANGELSDORF, P. C. **The role of pod corn in the origin and evolution of maize.** *Ann. Mo. bot. Gdn* **35.** 377-406. 1948. **577**

The two main hypotheses regarding the origin of maize are: (1) it is derived from a wild form of pod corn at one time indigenous to the lowlands of S. America; and (2) it is derived from teosinte. The former of these has in the past been subject to five main criticisms; (a) pod corn does not breed true; (b) it apparently arises spontaneously in cultures of normal maize; (c) it is frequently monstrous; (d) it differs from normal maize primarily by a single gene; (e) the hypothesis that teosinte is the ancestral form is more plausible. Recently this last reason has ceased to be valid as it has been shown that teosinte is probably the progeny of the hybridization of maize and *Tripsacum*, and therefore the author turned to the pod corn hypothesis as the only other plausible alternative and examined it. The history and distribution of pod corn are gone into as far as they affect the hypothesis. The fact that plants homozygous for the gene Tu are usually sterile is not a valid argument against the podcorn hypotheses as if Tu is an archaeic gene it is, in modern maize, devoid of its original modifiers, and is uncontrolled to a large extent in its expression. The author has carried out investigations in an attempt to breed homozygous pod-corn and has little doubt that in time he will succeed. He has demonstrated the existence of a mutation tu^h or 'half tunicate' which is a weak form of tunicate, and finds that there are weaker forms still present in living varieties. This series provides a progression from the Tu pod-corn to the tu normal, a progression which does not exist if one assumes teosinte as the ancestral type. The apparent spontaneous occurrence of solitary tunicate spikelets in ears which are otherwise non-tunicate may be explained on the basis that the 'normal' variety is really a very weak tunicate one, and this develops in a part of the ear more strongly than usual, though the reason for its so doing is not clear. The fact that pod-corn is frequently monstrous can again be explained by the fact that the Tu gene is acting outside its proper nuclear background. The manifold morphological effects of the Tu gene are described and it is pointed out that many if not all of its effects result in the formation of primitive characters.—T.D.H.

LEGUMES

CHEVALIER, A. La culture du soja en Afrique occidentale. [**Soybean cultivation in French West Africa.**] *Rev. Bot. appl.* **28.** 259-60. 1948. **578**

Soybean cultivation in French West Africa is recent as it only started in Ivory Coast in 1939 with seed produced by the agricultural stations of Ferké and Saria, and has mostly developed in the Middle

Ivory Coast and in High-Volta. In 1941, 417 tons were obtained from 984 ha., but production scheduled for 1942-43 was not reached. Later, production was scheduled at 2000 tons. In 1946 the Ivory Coast exported 380 tons. It is reported that with the variety " Kédélé blanc " 1696 kg. per ha. have been obtained. " Kédélé blanc" and " Makara noir " are the varieties mostly cultivated. Soybean cultivation is extending, although many natives oppose it because they prefer groundnut and bean. Cultivation of "Teperary bean" which was introduced in Sudan about 15 years ago, has also developed.—E.B.

Baldoni, R. Prove sperimentali sulla coltivazione della soia. [**Trials on soybean cultivation.**] *Ann. Sper. agrar.* **2.** 603-42. [English summary p. 640] 1948. [Bologna, Istituto di Agronomia generale e Coltivazioni erbacee dell'Università] **579**

Trials on varieties, density, time of sowing, phosphatic manuring, bacterial inoculation, inter-cropping, and catch cropping for forage have been carried out for several years in different Italian regions, and relative conclusions are given. The author is of the opinion that in the regions considered, there is no advantage in extending soybean cultivation as it would take the place of maize (during spring-summer), this being a more productive crop, especially where other leguminous plants are largely grown in rotation. A small diffusion of soybean is foreseen only on sub-acid soil, where it is difficult to grow other leguminous plants. As a forage summer crop, on irrigated soils, it can substitute maize and sorghum.—E.B.

Sengbusch, R. v. and Zimmermann, K. 20 Jahre Süsslupinenforschung und -Züchtung in Deutschland. [**Twenty years of research and breeding of the sweet lupin in Germany.**] *Forschungen und Fortshritte* 21/23. **7.** 1947. [Luckenwalde/Mark] **580**

This history of the development of the sweet lupin over the past 20 years reviews the problem of protein content, the history of the cultivation of several species of lupin in Germany, the discovery of the alkaloid-free mutants in 1927, and the subsequent development of the sweet lupin together with methods of testing for characteristics.

The result of research is a lupin for green fodder which gives sufficiently high yields and one in which the objectionable qualities have been almost removed. It is hoped that, in the next 20 years, the problem of producing a sweet lupin will be entirely solved perhaps by the production of dominant mutations by artificial means.—D.B.

Porter, K. B., and Weiss, M. G. **The effect of polyploidy on soybeans.** *J. Amer. Soc. Agron.* **40.** 710-24. 1948. [Iowa Agric. Exp. Sta., Ames] **581**

Comparison in the field of tetraploid and diploid forms of Lincoln and Richland soybeans showed that the tetraploids equalled or exceeded the height of the diploids during early stages of growth but were significantly shorter during late stages. Mean dry weights of the former were slightly lower during early stages and significantly lower during later stages of growth.

The tetraploid when compared with the normal diploid, had thicker stems, longer internodes, shorter and broader leaves, larger seed and pollen, and later dates of flowering and maturity. Lateness of maturity and greater seed size were associated with the low number of seeds per plant. Mean seed yield of Lincoln and Richland tetraploid plants was 19.3 and 12.8 per cent, respectively, that of the corresponding diploid.

Seed of the tetraploids was higher in protein percentage, lower in oil content, and the iodine number of the oil was slightly lower than that of diploids. Dry matter of tetraploids compared with diploids was lower in early and late stages of growth and the same approximately in the middle of the growing period.—From authors' summary. See also *Plant Breeding Abstracts*.

Abad, J. R. Abonado del garbanzo. [**Manuring of chick-pea.**] *Ager, Madrid* **4.** 166. 1948. **582**

In Spain *Cicer arietinum* is important for human consumption. Results of manuring trials show that, in addition to dung the following mixture can be used: calcium superphosphate 60 kg., ammonium sulphate 15 kg., potassium chloride 25 kg. This mixture can be ploughed into the soil before sowing at the rate of 400-500 kg. per ha. When the first seedlings appear, sodium nitrate can be applied at the rate of 50-75 kg. per ha. As this leguminous plant absorbs only little nitrogen from the air, it gives better yields also with nitrogen manuring. Calcareous soils are bad, as this plant absorbs lime in the form of calcium bicarbonate; this is transformed into carbonate that renders the legume very hard. For the control of the disease caused by *Ascochita pisi*, spraying of copper sulphate before the appearance of the fungus is advised. Disinfection of seeds with copper sulphate is not advised.—E.B.

Agricultural Engineering Record. **Pea harvesting survey.** *Agric. Engng Rec.* **2.** 152-4. 1948. [N.I.A.E., Silsoe, Beds.] **583**

The account based on an investigation made by the Farm Mechanization Enquiry of the N.I.A.E. into methods of harvesting peas grown for drying or canning on silt soils of South Lincolnshire.

Five distinct methods are described. They involved: threshing from the stack some months after harvest; threshing in the field from wads; combine harvesting with a pick-up attachment from wads; thrashing in the field from tripods; and thrashing in the field from wads or temporary stacks built so that thrashing continued when weather was too wet for carrying the wads. Peas grown for canning were hand-loaded and transported to the viner within a few hours of cutting.

Methods of cutting, determination of moisture content, labour requirement, losses during harvesting and weather conditions are compared. The quicker methods of harvesting gave good results in a dry season. Tripoding gave a bright sample of peas and required a few more man-hours than drying in the wad, and in wet weather is likely to be the most satisfactory method of drying. The greatest labour demand for harvesting canning peas was for carting—here there is scope for use of green-crop loaders. In dry seasons, mechanization can do much to speed up pea harvesting and reduce labour requirement, but tripods although requiring a larger labour team, are necessary in wet weather. —K.O.

Sasanka, S. de. **Soybeans in India.** *Soybean Digest* **8.** 45-7. 1948. [Indian Inst. Sci., Bangalore and Dept. Food Tech. Mass. Inst. Tech.] **584**

After experiments with soya milk on humans in the Bengal famine of 1943 had proved satisfactory, work started systematically at the Indian Institute of Science, Bangalore. The methods for production of highly palatable and nutritive soya milk is described with this composition—

Total solids	10.15 per cent.
Protein	4.2 ,, ,,
Fat	3.4 ,, ,,
Carbohydrate	1.8 ,, ,,
Salt	0.75 ,, ,,

In comparison with cow's milk, soya milk contains less Vitamin A and riboflavin, but more thianine, nicotinic and ascorbic acid. Experiments indicate that with the addition of different foods and elements it is possible without greatly increasing cost of production to evolve a fortified soya milk which has higher supplementary feeding value than cow's milk. The " nutty " flavour is counteracted by addition of 15-20 per cent cow's milk.

A committee under the Food Department of the Federal Government recommending production of soya milk, flour and oil emphasised :— 1. High protein and fat content of soya milk make it an excellent supplement to the poor man's diet. 2. As high yielding pulses, soybeans are capable of playing an important part in crop rotation. 3. Soya bean cake is an excellent fodder crop for poorly fed Indian cattle. 4. Oil from the beans is of great industrial importance.

The Committee feels the public should be educated as to the nutritive value of the soybean and they should be taught recipes which include processed beans. More research on the soybean and its products should be done and food industries encouraged to use these products.—K.O.

Risbec, J. Dans quelle mesure la menace des insectes affecte-t-elle la production de l'arachide? **[To what extent does the danger of insect affect ground-nut production ?]** *Rev. Bot. appl.* **28.** 381-9. 1948. **585**

This article is based on researches carried out in Senegal by the author. Behaviour of insects throughout the year in respect of *Arachis* is observed. On the whole, damages caused by insects on the field are small, while they are more serious during storage, particularly if the nuts have been shelled. In the case of *Pachymerus cassiae*, the only insect capable of perforating the shell, damages are not serious if the crop is exported or utilized every year. Disinfection of the storehouse with carbon sulphide and new synthetic insecticides can be carried out. Against *Aphanus* and *Dieuches* the use of DDT and Gammexane is advised. DDT powder must be employed at a concentration superior to 5 per cent and, as its activity must be maintained from January until May, it must be applied twice. Silos would probably be a protection against insects, but it is difficult to extend their use in the tropics. —E.B.

Allington, W. B., and Chamber, D. W. **Brown stem rot of soybean.** *Phytopathology* **38.** 793-802. [Illinois Agric. Expt. Sta.] **586**

Cephalosporium attacks the vascular elements and if temperature is low before harvest the weakened stems lodge badly. In Illinois penetration of the roots may occur 3-4 weeks after planting, the fungus being a vascular parasite. It does not overwinter in the stems. Greenhouse experiments show that soil temperature is not an important factor but that air temperatures of 21°C. and below were conducive to the disease. Aerial survey indicated that all fields known to have grown soybeans more than once in 4 years were affected. The recommendation is to grow three successive annual crops other than soya between soybean plantings. No alternative hosts to soya and running beans were found in a limited survey. —K.J.S.

Henderson, J. H. M., and Veal, Mary P. **The effect of the interrelation of boron and manganese on the growth and calcium uptake of blue lupine (*Lupinus angustifolius* L.) in solution culture.** *Plant Physiol.* **23.** 609-20. 1948. **587**

Blue lupin seedlings grown for 15 days in Hoagland and Arnon's nutrient solution were supplied with boron and manganese at 0.5 to 15 p.p.m. levels. Generally plants grown in solutions containing boron had more secondary roots than those grown without B; dry weight, length of stems and roots were greater in B-cultures than in Mn cultures and Ca uptake was greater in plants grown with B. Optimum boron concentration for blue lupin was 7.5 p.p.m. with a wide range of tolerance (0.5—15 p.p.m.). Boron deficiency gave plants with reduced root and top growth a defective meristematic tissue. Antagonism between B, Mn and Ca does not appear important, boron acts as a growth stimulant apparently.—K.J.S.

РУБИН, Б. А., АРЦИХОВСКАЯ, Е. В. и ЛУТИКОВА, О. Т. Об особенностях обмена у круглозерного и морщинистого гороха в период прорастания зерна. *Доклады Акад. Наук СССР*. Том 59. *No.* 1. стр. 103-6. 1948.

RUBIN, B. A., ARCIHOVSKAJA, E. V. and LUTIKOVA, O. T. [**Characteristics of exchange in round and wrinkled peas during germination of the grain.**] *Doklady Akad. Nauk. SSSR.* **59.** 103-6. 1948. **588**

It has been observed that different biological forms of peas are characterized by specific peculiarities of exchange which are exhibited in both the vegetative and reproductive organs. In view of the fact that in the latter case the exchanges occur only at the end of the developmental stage of the peas (grain ripening), it is considered important to determine whether this is due to laws characteristic of a specific growth stage.

There is indication that the energy of translocation of plastic substances from the cotyledons to the young plant is much greater in wrinkled than in smooth peas, and in smooth peas at the first stage of growth the rate of migration of carbohydrates is slower than the migration of nitrogenous substances. Seedlings in the dark are subject to considerable loss of plastic substances, and this loss is specially great in wrinkled peas which lose 6 to 7 times the amount of nitrogenous substances lost by smooth peas.

Respiration stimulates the energy of migration of sugars from the cotyledons to the young shoot and there is high loss of sugars in respiration of wrinkled peas in the first phase of seed germination. This differs from the observation made in regard to smooth peas, where there is insignificant loss of sugar with respiration and a lower rate of migration of sugars from the cotyledons to the shoot, together with lower activity of proteolytic processes. This low rate of migration is conditioned by peculiarities of the ferment system, and is connected with the extremely slow development of the seedling observed in this form of pea.—M.H.

BOND, Laura. **Origin and developmental morphology of root nodules of *Pisum sativum*.** *Bot. Gaz.* **109.** 411-34. 1948. [Wellesely College, Wellesley, Massachusetts] **589**

The anatomy of the root in the region of nodule development and the development of the nodule itself are described and illustrated.

" Root nodules originate by proliferation of the cortical parenchyma cells in the vicinity of the rhizobial infection strand, which enters the root through a root hair and penetrates through three to five layers of cortical parenchyma cells. The number of cells in the nodule increases at first by divisions throughout a spherical mass of cells, then by the action of an apically localized meristematic region. Branches of the infection strand penetrate many of the cells in the central region of the developing nodule, and rhizobia are released into the cytoplasm of the host cells. Divisions occur in some infected cells, but no division stages were observed in cells having many rhizobia in the cytoplasm.

The nodule becomes differentiated into an infected or bacteroid region, adjacent to the apical meristematic region, and an uninfected cortical parenchyma. The root epidermis is broken as the nodule enlarges, but the nodule does not emerge from the root cortex."

The development of the vascular strand is described and chromosome number in nodule cells has been studied. Near the meristem it is usually tetraploid and in the cortex diploid but exceptions occur. [See next abstract.]—D.B.

BOND, Laura. **Responses of pea roots to application of certain growth-regulating substances.** *Bot. Gaz.* **109.** 435-7. 1948. [Wellesley College, Wellesley, Massachusetts] **590**

The study was undertaken to find out whether some specific substance produced by the rhizobia stimulates proliferation of the root cortex to form nodules. The reactions of roots of *Pisum sativum* to various growth-regulating substances are described but none of the growth substances used stimulated division of the cortical parenchyma cells which, as shown in the previous abstract, is the seat of nodule formation. [See previous abstract.]—D.B.

SILVA, J. G. da. Estudos sôbre a inoculação da soja. [**Studies on the inoculation of the soybean.**] *Rev. Agric. Piracicaba* **23.** 365-78. [English summary, p. 377.] 1948. [Inst., Agron., State of São Paulo, Brazil] **591**

Plot tests of soybean seed inoculation with *Rhizobium* were carried out at four localities in the State of São Paulo in 1947-48. In Pindorama sandy soil and " terra roxa" of Ribeirão Preto there was a significant increase in seed production, number of nodules per plant, thousand grain weight, yield and protein content, with a parallel diminution in defective seeds and oil content. "Urbana Humus Inoculator " was found to be superior to agar cultures of native strains. No significant results were found in an experiment carried out in a soil of the " massapé " type in Mococa and in a mixed type of acid soil in Campinas.—Author's summary.

Veenbaas, A. Onderzoek naar de consumptiewaarde en chemische samenstelling van droge peulvruchten, oogst 1942. [**Study of the consumption value and chemical composition of dry pulse, 1942 harvest.**] *Med. LandbVoorlDnst* No. 58. pp. 50. 1948. [Cent. Inst. Agric. Res., Wageningen, Netherlands] **592**

A detailed account is given of the study of the 1942 pulse crop for dry matter, crude protein, ash, crude fibre, calcium, phosphorus, carotene and aneurin (vitamin B_1) content and value for consumption. A few mixed samples were examined also for their fat, trocopherol (vitamin E), manganese, iron, lactoflavin (vitamin B_2) and molybdenum content and the biological value of the protein. Varietal differences are discussed. Environmental factors and management (time and method of harvesting, etc.) had a far greater effect on chemical composition and consumption value than did varietal differences, in which soil and manurial treatment were the most important factors although weather, stage of maturity and method of harvesting also had an effect. Flavour was affected by the weather. On the whole, on the heavier soils the molybdenum content was higher, the protein, P_2O_5 and carotene content somewhat higher, the consumption value rather better and the percentage waste (grains which were broken, spotted, germinated etc.) slightly lower. In manganese content, material from the sand soils was markedly superior to that from the clay soils.—G.M.R.

OIL CROPS

Bärnheim, C. Oljeväxtodling i Mellansverige. En västmanländsk odlares erfarenheter. [**Cultivation of oil crops in Middle Sweden. Experiences of a Västmanland grower.**] *Lantm. Svenskt Land* **32.** p. 713. 1948. **593**

In Västmanland good results are obtained with oil flax and also with autumn and spring rape. Oil flax gives the most uniform yields and is least susceptible to insect attack: harvesting can take place late in October. Autumn rape should be sown on bare fallow at the beginning of August. It ripens in the last half of July, and can conveniently be followed by an autumn cereal crop. Harvesting of oil crops with a combine gives good results.—R.P.J.

Zanini, E. Le piante oleaginose in Sicilia. 2. Il sesamo [**Oil plants in Sicily. 2. Sesame**] *Olearia* No. 3. pp. 6. 1948. **594**

Sesame cultivation in Sicily is ancient, and at present is limited to an area of about 1250 acres. The vegetative period is 4-5 months, and, according to the position in the rotation, it is grown as a principal crop during spring-summer, or as a catch crop during summer-autumn. Because of low rainfall from spring until autumn, it gives good results only under irrigation. Information is given on its position in the rotation, manuring, sowing, soil, irrigation, working, harvesting, and conservation. Trials have been carried out in 1946-47 with the purpose of determining water requirements. Yield varies from 8 to 16 quintals per ha. according to manuring (*Sesamum* is very susceptible to nitrogen), to cultural cares and water supply. Oil content in the seed is about 50 per cent. Sesame oil is used for human consumption and in many industries; the cake is of high feeding value for sheep and cattle, and is also used as manure. The Sicilian environment is favourable to oil crops, and *Sesamum* cultivation, according to the author, should be extended to reduce importation.—E.B.

Childs, A. H. B. **Sunflower production in the Iringa district.** *E. Afr. agric. J.* **14.** 77-8. 1948. [Agric. Officer, Iringa] **595**

Advocating sunflower growing in the Iringa district, this report includes a detailed account of the seed uses—as a source of oil, and the residue and the green plant as cattle food. The account includes precautions to be taken against sunflower pests (e.g. eelworms and birds), cultivation, seeding, harvesting, threshing, drying and selection of seed.

Approximate net costings and cash returns show the attractiveness of the crop to non-native farmers using tractor draught. As African natives could produce the crop more cheaply, this illustrates how sunflowers could provide the long needed cash crop on the "miomba" soils of the Iringa district at altitudes from 7000 ft. in the forest belt, to 3000 ft. in the arid thorn country.—K.O.

Vachhani, M. V. **The effect of the cultivation of brassicae oil-seed crops on the soil fertility.** *Curr. Sci.* **17.** 300. 1948. [Dokri Agric. Res. Sta.] **596**

The belief among Indian cultivators that the brassicae are gross feeders and exhaust the soil for the following crop is a factor against increasing the present area of about 25 million acres under oil-seeds. Data obtained in field experiments at Dokri (Sind) in 1944-1946 show that the oil seed crop *torio* and *sarson* had no adverse effect on the yield of succeeding cotton, jowar and wheat crops and could well be included in a regular crop rotation. Cotton is exceptional in that the yield after fallow was significantly greater than yield after wheat.—K.J.S.

Svensk Frötidning Sveriges Oljeväxtodlares Centralförenings verksamhet 1947. [**The work of the Central Association of Swedish Oil Crop Growers in 1947.**] *Svensk Frötidn.* **17.** 130-3. 1948. **597**

As yet, only preliminary reports on the yields obtained in 1947 are available. It can, however, be stated that the year's yield of autumn oil plants was much poorer than that of 1946, of spring oil plants on the other hand decidedly better. On the average of the whole cultivation area autumn rape yielded approximately 1200 kg. per ha. (in 1946 it was 1800 kg. per ha.). The best results were obtained in the province of Kalmar, and average yields in Scania, Östergötland and Gotland were between 1000 and 1100 kg. per ha.

Autumn rybs (*Brassica rapa oleifera*) gave an average yield of approximately 850 kg. per ha. The best results with this crop were obtained in Östergötland, the poorest in Scania.

Spring rape gave a considerably better yield than the previous year—1450 kg. per ha. compared with 995 kg. per ha. in 1946. The reason for this good result, the best since 1942, is primarily that in South Sweden attacks by noxious insects were only slight. The yield in the province of Kalmar and on Gotland (approx. 1200 kg. per ha) was somewhat lower than in the other areas, while Östergötland and Halland show yield figures (1500-1600 kg. per ha.) which are higher than the total average.

White mustard has given a much better yield than it has for a long time, on the average of the whole cultivation area approx. 1250 kg. per ha. compared with 1070 kg. per ha. in 1946. The best results were obtained in Scania and Västergötland, the lowest yields in East Sweden.

The average yield of oil flax lies between 1200 and 1250 kg. per ha., which is slightly less than the normal yield, but considerably more than that of 1946, which was only 970 kg. per ha. The two most important areas of cultivation, Scania and Östergötland, gave about the same result and approximate to the average figure for the country, while *inter alia* Gotland and the province of Kalmar gave a slightly lower yield.

The results of oil crop cultivation in 1947 have been good. During the year the Association has conducted a large number of trials, which have been brought together in large experimental grounds thus reducing the cost of the work and ensuring more effective management.—R.P.J.

MARACAY, Dirección de Agricultura, Departamento de Genética Circ. No. 15. Dos nuevas variedades de ajonjoli, Venezuela-51 y Venezuela-52. [**Two new varieties of sesame, Venezuela 51 and Venezuela 52.**] By *D. C. Langham* and *M. Rodríguez.* 1946. pp. 35. [English summary, 34-5.] [Head of Dept. Genetics (D.G.L.) and Head of Division for Sesame, Dept. Genetics (M.R.), Min. Agric., Venezuela] **598**

Venezuelan local varieties of *Sesamum indicum*, relatively unproductive and susceptible to disease and attack by aphids and other insects, are being replaced by two new varieties bred by the Venezuelan Department of Genetics. Venezuela-51 is early, maturing in 80 to 90 days, resistant to the common aphid, high-yielding, single stalk, three capsules per leaf axil, resistant to " wet feet" but due to lack of leaf gland is susceptible to drought. This variety is particularly recommended for early planting to make maximum use of the rainy season. The seed is light-coloured, and about 50 per cent of its weight is oil. The plant turns yellow when the seeds are ripe and may be harvested before the seed pods open without loss in oil or total production. This is a distinct advantage over most varieties. Venezuela-51 originated from an exceptional plant isolated from a variety obtained in China in 1940.

Venezuela-52, is a medium late variety, maturing in 110 to 120 days, resistant to aphids, high-yielding, with many branches, three capsules per leaf axil predominantly, susceptible to " wet feet " but because of many leaf glands resistant to drought. The seed is light brown and yields about 52 per cent of its weight in oil. This variety is particularly recommended for regions of low rainfall, although it will resist heavy rains if the soil is well drained. Venezuela-52 originated from a cross between Selection 5 (a single-stalked type with three capsules per leaf axil, resistant to aphids, and susceptible to *Alternaria* and *Cercospora*) and *Criollo* (many branches, one pod per leaf axil, susceptible to aphids and resistant ot the common fungous diseases).—Author's summary.

FARMER'S WEEKLY, BLOEMFONTEIN. **Sunflower's status in the crop family.** *Fmr's Wkly, Bloemfontein* **76.** 52-3. 1948. **599**

This report shows how the challenge from groundnuts has made its mark on the amount of sunflower seed grown in South Africa. Not only is the groundnut more popular with the oil expressers but, unlike the sunflower, the laborious decorticating process is unnecessary. It is likely that the sunflower crop will revert to its former minor status of importance in farming.

In order to ascertain how the new varieties of semi-dwarf sunflower seed, imported from America, would fit in with Free State conditions, experiments were conducted on selected plots under dryland and irrigation conditions.

Results showing " revealing discoveries" with varieties Mauthner, Mars and Jupiter, in contrast to common strains are illustrated and described. Details of time, labour requirements for harvesting, climatic conditions and soil factors determining yields of crops, are given. Highest oil content was from the common strain. For seed production Mauthner was the most profitable strain. Results of experiments on groundnuts, sorghums, Sudan grass, millet and soya beans are also given. (See also *Field Crop Abstr.* Vol. 1., Abs. 1417.—K.O.

Severen, M. L. van Okra, posible fuente de aceites para El Salvador. [*Hibiscus esculentus* **L. possible source of oil for El Salvador.**] *Rev. Agric. Costa Rica* **20.** 447-8. 1948. [Head of Chemistry Dept., Nat. Centre of Agronomy, El Salvador] **600**

An article originally published in *Rev. ECA El Salvador*, Vol. 3. No. 2. 1948 is reprinted. Chemical analyses are given of the oil obtained from the seeds of *Hibiscus esculentus*, of the fatty acids of the oil and of the residual oil cake, which can be used as a concentrated animal feeding-stuff. At the San Andres Experiment Station, El Salvador, the variety Clemson Spineless gives a seed yield of approximately 5000 kg. per ha. or, the oil content of the seed being 17 per cent, 850 kg. oil per ha. —G.M.R.

National Institute of Agricultural Botany. Seed Production Committee. Seed Notes No. 25. 1. **Seed disinfection of linseed.** *N.I.A.B. Seed Notes.* pp. 1-2. Nov., 1948. **601**

This reports the experience gained during the war with seed-borne diseases of flax, and advocates its application to linseed to-day. Disinfection of flax-seed, before sowing, with "Nomersan" a non-mercurial, non-poisonous dust containing as its active agent tetramethyl-thiuram disulphide, eliminated the danger of seed-borne parasites. Since 1941 the disinfection process has been applied at a rate of 12 oz. per cwt. of seed as a routine measure to all flax seed for sowing in the United Kingdom. The precaution of a large scale introduction of linseed varieties resistant to wilt (*Fusarium lini*) has already been taken, and seed disinfection would be equally prudent as the wisdom of treating flax seed is likely to be discontinued, if diseases that can readily pass from linseed to flax are allowed to develop unchecked over greatly increased acreages of linseed.—K.O.

Tombesi, L. Ricerche sperimentali sul fabbisogno idrico del colza. Nota 1. Il consumo idrico unitario. [**Experimental researches on water requirement of** *Brassica campestris* **var.** *oleifera*. **Note 1. Unit water consumption.**] *Ann. Sper. agrar* **2.** 595-602. [English summary, p. 602] 1948. [Roma, Stazione chimico-agraria sperimentale] **602**

The author has studied the influence that water and drought index have on unit water consumption. Referring to seed production only, unit water consumption (that is the quantity of water in litres necessary to form 1 kg. of dry organic matter at 100-105°C.) was 9846, 2362, 3243, 3610 respectively for water allowances of 32, 60, 100, and 200 per cent (100 being the optimal quantity).

Chlorophyll analyses have confirmed that low water availability induces changes in the amount of this pigment (12 mmgr. per square dm. with 200 per cent water supply and 16.68 mmgr. with 32 per cent) and in biometric and histologic characters. With a low drought index there is reduction in the mesophyll.—E.B.

FIBRE CROPS

Sweden, Lantbrukshögskolan Jordbruksförsöksanstalten. Medd. No. 22. Odlings-och berednings försök med spånadsväxter under år 1946. [**Cultivation and processing trials in fibre plants 1946.**] By *I. Granhall* and *N. G. Larsson*. 1948. pp. 48. [English summary pp. 45-7.] **603**

Variety trials were made with Herkules, Concurrent, Blenda, 2 Irish varieties Liral Prince and Liral Sussex and a new Svalöf variety Sv 0220. Stormont Cirrus, Sv 0416_2 and Sv 0800 were compared on a site in west Sweden. Results compared well with previous trials; Herkules was used as the standard; its yield was similar to the Irish varieties, and Sv 0416_2. If results between 1940-46 are averaged Hurkules and Concurrent are shown to give an equal long fibre yield, Hurkules gives better fibre quality, Concurrent gives more tow. Blenda would give good fibre quality were it not so liable to lodge. Sv 0220 was equal to Herkules as regards long fibre yield. Tests made in 5 different districts of Sweden between Herkules and Concurrent showed the former gave 20 per cent more straw but less seed. On more fertile soils Herkules compared still more favourably with Concurrent. Herkules and Blenda were also compared, and again on the better soils Herkules increased its lead. The 1946 tests showed Concurrent to be stiffer in the straw than Blenda or Hurkules. Early maturing varieties are usually easier to establish, especially when there is weed competition or bad weather. Unfortunately early straw maturing varieties are often low yielders. Blenda is somewhat earlier than Concurrent and Herkules which appear equal in this respect from several years' experience. In 1946 Liral Prince and Liral Sussex were very early.

The fertilizer trials started in 1944 were continued. Applications of 300-600 kg. per ha. of superphosphate have given no increase in straw and less seed. It should be remembered the soil where these experiments were carried out is more fertile than the average. Three hundred kg. superphosphate have given a consistent slight increase in long fibre. Potash has given quicker and more even plant establishment resulting in more straw but no more seed, nor did it affect quality. Powdered and granular phosphate and potash fertilizers were compared. Granulated superphosphate gave more straw, which the powdered form did not, and even the granulated potash showed a more even and consistent effect. Addition of 100 kg. sulphate of ammonia to the superphosphate and potash increased straw but not seed, and decreased long fibre yield. This effect was more marked with late nitrogen applications and it seems early applied nitrogen gives the best results. Further manuring trials are necessary. On comparing fertilizer effect on soils of high and low phosphate and potash content, it seems there is little correlation between the effect of a fertilizer and the amount of potash or phosphate already in the soil.

Results 1944-46 on comparisons between different times of sowing and harvest show that early sowing increases seed and straw yield; later harvesting gives more seed, and poorer fibre. On the whole early sown, early pulled crops give the best processing results, early sowing especially, improving fibre quality. In addition early sown crops are less likely to be laid and are more resistant to rust.

The following seed rates were compared: 90, 110, 130, 150 kg. per ha. As in earlier trials heavy seed rate resulted in more straw, and no more seed. Fibre quality was no better because thick crops were more susceptible to lodging.

To compare the efficiency of chemical weed killers, 3 per cent sulphuric acid was tested against 2 per cent Extar Sandoz, 1 per cent Am-Stirpan (nitro-creosol preparation) and 4 per cent Agroxone. All were applied at 1000 litres per ha.; 4 per cent Agroxone was obviously too strong and it was further tested at 1 per cent, 2 per cent and 4 per cent strengths. One per cent proved the most effective with least damage to the crop. In these trials, sulphuric acid worked better in changeable weather on account of its rapid action. Extar-Sandoz this year was more effective than Am-Stirpan. Agroxone was the most effective weed killer of the substances tested but the 4 per cent strength damaged the plant. All these preparations lowered fibre quality to some extent. Further experiments are necessary.

Cleaning of land for flax by spreading sodium chlorate in autumn against perennial weeds was tried out on various soil types. Unless rainfall is fairly high and the soil well drained, the usual rate of 200 kg. per ha. can seriously injure the crop.

Pulling of flax by machine and by hand, showed that more seed and better fibre quality resulted from the hand method.

A new trouble has been observed in flax crops—dying of the growing point just before flowering, followed by abnormal side branching. The resulting crop gives fibre of almost no value. Soils and plants have been analysed for any possible trace element deficiency. Two trials were laid out in 1946 to test the effect of boron and manganese deficiency. One experiment had to be abandoned because of drought, the other was harvested and seemed normal in every way.—N.D.

AFZAL, M. **Cotton growing in Egypt.** *Indian Cott. Gr. Rev.* **1.** 167-78. 1947. [Cotton Res. Lab., Lyallpur] **604**

Methods of cotton breeding and seed control organisations were studied during summer 1946. The general agricultural features of the country are described as well as the irrigation systems, and history and development of the cotton crop. Yields and acreages under different varieties of *Gossypium* sp. are tabulated and the chief production methods are described. The high yields obtained in Egypt are attributed to better varieties, successful cultural treatments, a well-organised seed supply system, and legislative increases for the control of different pests and diseases.—M.E.E.

FORBES, R. H. Directives de la culture cotonnière en A.O.F. [**Directives of cotton cultivation in French West Africa.**] *Rev. Bot. appl.* **28.** 219-28. 1948. **605**

The author, who has been technical adviser of the Office of the Niger from 1925 to 1935, summarizes the work carried out and presents à programme for the development of cotton cultivation. —E.B.

HENNING, L. J. **Has cotton a place in our agriculture?** *Fmg S. Afr.* **23.** 570-6. **606**

Reasons for the decline of the cotton industry are given, and it is suggested that in future production, cotton should be grown in a system of crop rotation, and on no account constitute a farmer's sole crop. With a stabilized price, cotton growing, with a view to production of fibre, making a source of oil available, and providing the residual oil cake in order to augment the sources of protein for the livestock industry, could probably be resumed. The main limiting factors in production are the late rains, bollworms, and jassids. Fortunately, a strain of cotton has been developed with a high resistance to the latter.

Better cultural practices are suggested, stressing the importance of individual growers, and the need for the planting time factor to be overcome probably by the use of ratoon cotton, a perennial. —J.T.B.

PATEL, P. L. **Improvement of cotton in middle Gujarat.** *Indian Cott. Gr. Rev.* **1.** 184-9. 1947. [Cotton Research Sta., Broach] **607**

About 20 per cent of the total cultivated area in middle Gujarat is under cotton in normal times. The crop is entirely rain-fed by the south-west monsoon which begins in June and ends by September, and yet in the Broach tract cotton cultivation is perhaps more thorough and advanced than in any other part of India. Fertility of the black cotton soils is maintained by a three-year rotation with *Sorghum* sp. or *Triticum vulgare* in the second year and the legume *Lathyrus sativus* in the third year. Green manuring and fallowing are also practised at certain intervals.

Formerly "Broach" cotton (a variety of *Gossypium herbaceum* var. *frutescens*) formed the main commercial crop and gained world-wide reputation for high quality, but the introduction of the Goghari variety with short, coarse staple and susceptibility to wilt disease greatly marred this reputation. Since 1913, however, improvement work has been in progress and high quality, wilt-resistant strains have been produced. Average performances are given for certain segregates and further research work is outlined.—M.E.E.

ANGLADETTE, A. Note sur la culture du cotonnier en Indochine. [**Note on cotton cultivation in Indo-China.**] *Cot. Fib. trop.* **3.** 73-112. 1948. [Chief, Agric. Serv. in the Colonies] **608**

Owing to the impossibility of importing cotton fibre during the second World War, the agriculturists of Indo-China have endeavoured to increase cotton production to its maximum. The local agricultural Services and Institutes of agronomic research have carried out a study on ecologic, agronomic and economic conditions of this crop followed by experimental work during 1942-43, 1943-44 and 1944-45. The relative conclusions are reported. Subjects of study are : soil, climate, delimitation of regions favourable to cotton cultivation, varieties (belonging to *Gossypium herbaceum* and *G. hirsutum*) and their improvement, cultural methods (including irrigation), diseases and pests and their control.—E.B.

ERICKSON, F. C. **The broken cotton belt.** *Econ. Geog.* **24.** 263-8. 1948. **609**

Great changes in land economy of the South have taken place within the past twenty-five years, due mainly to economic factors, and to a lesser extent, social and political causes. Consequently, what was once the Cotton Belt consists now of a few large areas of cultivation held together by narrow bands, with several small outliers. These changes are described, and results of the Cotton Control Act commented upon.

Cotton producers in the United States have of recent years been dependent on price-supporting measures. This cannot go on indefinitely, and the only way that better incomes for producers of cotton can be insured is through improvements in, and lower costs of production. Regions such as the Southern High Plains, and the Mississippi Delta Region, where large farms and level land permit the use of machinery, and the irrigated lands of New Mexico, Arizona and California, are favoured for future cotton production in the United States.—J.T.B.

LONDOÑO, B., M. Producción de algodón en el Departmento del Tolima. [**Production of cotton in the Department of Tolima.**] *Agric. trop.* **4.** No. 6. 12-8. 1948. [Agric. Exp. Sta., Armero, Dept. del Tolima, Colombia] **610**

Cotton growing was not begun in the Colombian Department of Tolima until 1933 ; 300 kg. fibre were harvested in 1934, and the figure has now risen to 1,411,100 in 1946 and (estimated) 2,400,000 in 1947. There are two cotton-growing zones, the north and the south, both fertile and flat and adapted to the use of machinery, and differing only in regard to rainfall. Research on varieties, the date of sowing, seeding rate, etc. has been continuously in progress at the Armero Experiment Station. The present article gives information on the varieties tested, grown and reproduced for seed, on the production already achieved, and on prospects. Colombia's requirements in cotton are still only one-third covered by home-grown material, and there is thus much room for extension.—G.M.R.

GRANADOS, L. C. D. Producción de algodón en el Departamento del Magdalena. [**Production of cotton in the Department of Magdalena.**] *Agric. trop.* **4.** No. 8. 22-3. 1948. [Director, Agric. Exp. Sta., del Magdalena, Colombia] **611**

The Department of Madalena is situated in the north of Colombia and has a coastline both on the Pacific and on the Caribbean. Information is presented on cotton varieties under trial at the Department's Experiment Station and in particular on results obtained from the varieties Delta Pine and Express del Brasil from Sept. 1947 to January 1948. Delta Pine 12 has given an average yield of 122 arrobas* per hectare, whereas 15 arrobas are considered the average for the variety at present grown in the coastal areas. The various advantages of using this tested and acclimatized variety are noted.—G.M.R.

*1 arroba=32 lb.

SPOON, W. Vlasvezel van Java. [**Flax fibre from Java.**] *Ber. Afd. Handelsmus. Kol. Inst.* No. 200. *Landbouwk. Tijdschr.* **56.** 15-18. 1944. [Received 1948] [Director, Afd. Handelsmuseum, Koloniaal Instituut, Amsterdam] **612**

Experiments in the growing of *Linum usitatissimum* in the Netherlands Indies began as early as 1875, mainly for seed but afterwards for fibre. Both types of culture were relatively successful in the highlands of Java but fell into desuetude until 1933, when experiments in the growing of flax for fibre were revived at an altitude of 4800 ft. (1400 to 1500 m.). An account is given of the quality of the harvests obtained from 1936 onwards, as judged by experts in Scotland, the Netherlands, Belgium and France. The opinions of the first few harvests were not very good, the fibre being too coarse and not strong enough, but of the last, 1938 crop an expert writes that the quality shows a considerable improvement compared with that of previous years, especially in regard to length, suppleness and fineness. It is regrettable that the outbreak of war put an end to the experiments. —G.M.R.

FERREIRA, J. C., Jr. Cultura do linho (*Linum usitatissimum* L.). [**The cultivation of flax.**] *Agronomia, Rio de Janeiro* **7.** 3-19. 1948. [Prof., Esc. Nac. Agron., Univ. Rur., Rio de Janeiro] **613**

The article contains a botanical description of flax, information on sowing, growing, manuring, and harvesting for fibre and seed respectively, and on the processing of flax for fibre.—G.M.R.

KIRBY, R. H. Le jute et ses succédanés : possibilités de production dans l'Empire Britannique [**Jute and its substitutes : possibilities of production in the Colonial Empire**] *Cot. Fib. trop.* **3.** 33-42 and 113-22. 1948. **614**

A translation of the article appeared in *Bull. imp. Inst.* 40, 97-131. 1947. [See *Field Crop Abstr.* 1, Abst. 838.]—E.B.

ANGLADETTE, A. Le développement de la culture du jute en Indochine de 1941 à 1944. [**Development of jute cultivation in Indo-China from 1941 to 1944.**] *Agron. trop.* **3.** 594-629. 1948. **615**

In order to reduce importation, it was decided in 1941 to raise jute production by extending the cultivated area and increasing yield per unit. In Indo-China both jute species, *Corchocus capsularis* and *C. olitorius* are grown, and 16 varieties (local and foreign) are distinguished. Jute is grown in rotation with rice, maize and garlic. This account of the work carried out includes varietal and cultural improvements, control of parasite insects and diseases, and preparation of the fibre.—E.B.

SAMUEL, P. La culture et le rouissage de l'*Urena lobata* par les indigènes des régions équatoriales du Congo belge. [**Cultivation and retting of** *Urena lobata* **by the natives of the equatorial regions of Belgian Congo.**] *Bull. agric. Congo belge* **39.** 3-28. 1948. **616**

Urena lobata is known for its fibre as a substitute for jute. This plant is an annual shrub of the Malvaceae and is reported not to shoot after harvest in equatorial regions. Its cultivation is increasing in Belgian Congo where it is followed by paddy or, better, by manioc. Detailed information on cultivation (soil, rotation, seeds, sowing, cultural practices) as well as on retting is given.—E.B.

JACQUES-FÉLIX, H., and RABÉCHAULT, H. Recherches sur les fibres de quelques Urticacées africaines. [**Researches on the fibre of some African Urticaceae.**] *Agron. trop.* **3.** 339-84. and 451-88. 1948. **617**

It has been observed that plants of industrial interest for fibre production are much more numerous in the tropical regions of Asia than in those of Africa. This is due to the fact that Asia is richer than Africa in species of Urticaceae, but also to the fact that the natives of Africa have very little use of fibre plants, which are still unknown to a great extent. Ramie cultivation (a fibre plant of Asiatic provenience) has proved unsatisfactory in the Cameroons ; probably one of the reasons is that *Boehmeria nivea* was grown instead of *B. utilis* which is more suitable for equatorial climate.

Results of research on African Urticaceae, which could be of interest for fibre production, are reported. Information regarding distribution, botanical characters, anatomy of the stalk, qualities of the fibre (illustrated by plates) are given for the following plants :—*Fleurya podocarpa* Wedd. ; *F. aestuans* Gaud. ; *Laportea alatipes* Hook ; *Urera cordifolia* Engl. ; *U. cameroonensis* Wedd. ; *U. Thonneri* ; *U.* sp. ; *Girardinia condensata* Wedd. ; *Boehmeria platyphylla* Don. ; *B. platyphylla* var. *nigeriana* Wedd. ; *Pouzolzia andongensis* Hiern.

In the second part of the article the facts are examined from a comparative and criticial point of view. Results confirm that there is a great analogy between the fibre of these species and the ramie fibre. A classification of the plants based on the characters of the fibre is given.—E.B.

GADKARI, P. D., and JOSHI, V. K. **Studies in the agronomy of Gaorani cottons. 1. Preparatory tillage and interseasonal cultivations.** *Indian J. agric. Sci.* **16.** 504-11. 1947. [Dept. agric., H.E.H. Nizam's Dominions] **618**

To increase cotton yields in Marhatwada, cultivation experiments using Gaorani 6 strain, at the Cotton Research Station Nanded, showed that (1) Variations in frequencies and timings of bakharings and ploughings in preparatory tillage for cotton grown after *kharif* (monsoon) or *rabi* (cold weather) *jowar* (*Sorghum vulgare*) or after groundnut did not improve yield of Gaorani 6. (2) A weeded crop gave a significantly higher yield than the unweeded one. One weeding should be normally enough since additional weeding did not offer any extra benefit except in years of abnormally late rains. (3) Khurpi is the most suitable implement for intercultivation operations in Marhatwada.—From Author's Summary.

COENE, R. de. Méthodes statistiques pour l'étude des essais de rendements cotonniers à Bambesa. [**Statistical methods for the study of trials of cotton yields at Bambesa.**] *Bull. agric. Congo belge* **39.** 803-10. 1948. **619**

In the statistical study of comparative trials of cotton yields, when differences among varieties are not very great, Papadakis' method is very useful, when the soil of the block is very heterogeneous.

This method, however, is fully valid only (1) when the number of degrees of independance of the error is equal to 30 at the minimum ; and (2) when the number of plots per block is sufficiently high ; that is to say, when the block is very heterogeneous. It appears that the second condition is the principal, and that in the Bambesa case, a minimum of 6-7 plots per block is indispensable. On the other hand, for trials including a small number of varieties (two or three), the couple method with evaluation of the variety in relation to the test plot gives more accurate results. Whatever may be the method followed, at least eight repetitions are necessary.—E.B.

Pearson, E. O. Quelques notes sur la culture du cotonnier en A.E.F. [**Some notes on cotton cultivation in French Equatorial Africa.**] *Cot. Fib. trop.* **3.** 61-72. 1948. [Emp. Cott. Gr. Corp.] **620**

This article relates the observations collected by the author when visiting in January 1948 the cotton areas of French Equatorial Africa (Chad and Ubangi). Only American Upland varieties of *Gossypium hirsutum* L. are grown. Control measures of bacterial disease, *Jassid. Helopeltis, Diparopsis* and *Platyedra* are discussed. In a note by the editor, in regard to heterogeneity observed by the author in cotton cultivations, it is pointed out that since 1946 the I.R.C.T. has endeavoured to obtain varieties which combine in high production and quality of resistance to diseases and pests. Such effort has already started to give good results.—E.B.

Cass Smith, W. P., and Harvey, H. L. **Zinc deficiency of flax.** *J. Dept. Agric. W. Aust.* **25.** 136-42. 1948. **621**

This deficiency disease only attained economic significance in Western Australia in 1945 when the characteristic " dieback " condition was observed in many crops of *Linum usitatissimum*. Symptoms included the death of the topmost leaves of the plant, bronze leaf spotting and leaf resetting, and regrowth of the stunted main stem by production of lateral shoots from the base. Field trials were conducted to test the effect of zinc fertilizer applications on the incidence of the disease in affected areas. Alternate blocks were dressed with superphosphate and superphosphate with zinc sulphate and it was found that the latter dressing gave very much better results particularly where the ground was excessively wet. Straw evaluations also showed improvement in quality and yield of fibre due to zinc applications. Further observations attributed zinc " dieback" to excessive soil moisture, type of soil, superphosphate applications and other factors, which will require further investigation.—M.E.E.

Granhall, I. Svensk lindberedning i modern utformning. [**Modern flax processing in Sweden.**] *Kungl. LantbrAkad. Tidskr.* **87.** 409-17. [English summary p. 117.] 1948. **622**

At present, there are six mills in the country, for the processing of flax straw ; all are owned and managed by organisations of flax growers. As the total capacity of these mills is about 2500-3000 tons of fibre, produced from 10,000 acres, about 60-70 per cent of normal Swedish fibre flax consumption can be produced at home. New and improved methods of flax processing are being investigated at the Flax Laboratory at Svalöf and at the different mills. Fundamental bacteriological and chemical research is also being carried on at the Royal Institute of Technology at Stockholm. To produce a good fibre, a good flax straw is essential. Cultivation methods are therefore being throughly investigated in extensive field trials, conducted co-operatively by the Federation of Mills, the Central Agricultural Experiment Station and the Flax Laboratory. The breeding of improved varieties of Svalöf has given very promising results. —From English summary.

Granhall, I., and Zienkiewicz, H. Inverkan av olika ogräsbekampningsmedel på skördentbyte och kvalitet hos spånadslin. **Effect of different weed control substances upon quantity and quality of flax yield.** *Vaxtodling. Plant Husbandry* No. 3. pp. 65-73. [English summary, pp. 72-3.] 1948. [Royal Coll. Agric., Sweden] **623**

Flax samples from field experiments during 1941-1947 were examined. Hormone derivatives in particular reduced the length of the fibre by causing branching at lower levels of the stem ; there was some slight increase in seed yield due to this. Irregular and spiral growth of the stem induced by the hormone reduced fibre quality still further. Copper salts and dinitro-ortho cresols were slightly less harmful.—K.J.S.

Neirinckx, G. Teneur en gossypol des graines de coton du Congo Belge et de leurs sous-produits. [**Gossypol content of cotton seeds of the Belgian Congo and of their by-products.**] *Bull. agric. Congo belge* **39.** 819-40. 1948. **624**

This article relates the work carried out in order to determine the principal chemical constituents of cotton seeds and of their by-products and to study the possible uses of these residual products of extraction of cotton oil. Information on gossypol is given, and the possibility of extracting it and eliminating its toxicity is examined.—E.B.

GAMARRA, J. F. Clasificación comercial del algodón. [**Commercial classification of cotton.**] *Agric. trop.* **4.** No. 1. 13-8. 1948. [Cotton Assessor, Dept. Agric., Colombia] **625**

An exposition of the characters governing the commercial value of cotton with special reference to the Colombian cottons, which vary in degree of fineness in accordance with the region in which they are grown.—G.M.R.

IYENGAR, R. L. N. **Variation of fibre length in a sample of cotton.** *Indian Cott. Gr. Rev.* **1.** 179-83. 1947. [Technological Lab., Bombay] **626**

Factors causing variation in lint samples are analysed. Variations occur in single seeds and between separate seeds. Mean fibre length varies with the age of the plant, with environmental factors such as irrigation, manuring, spacing and rotation, and with the place and season of growth. The variation of fibre length in a bulk sample of cotton proved to be only slightly more than that existing in a single seed.—M.E.E.

MCCALL, E. R., CIRINO, V. O., STARK, S. M. Jr., and GUTHRIE, J. D. **The organic acid content of various samples of raw cotton fiber in relation to ash alkalinity and leaching by rain.** *Science* **108.** 360-1. 1948. **627**

Data are recorded for 22 samples of different kinds of varieties of cotton fibre grown in different localities. Raw cotton is shown to vary greatly in organic acid content, particularly l-malic acid. Some factor other than variety seems to govern the organic acid content. There is correlation between organic acid content and ash alkalinity, particularly high when pectic acid is included. Rain reduced total organic acids from about 20 milliequivalents per 100 grm. dry cotton to 6 milliequivalents; l-malic from 15 milliequivalents to 2 milliequivalents; pH of water extract increased from pH 6.2 to 9.0 during rain leaching.—K.J.S.

NAUDE, P. J. **Experiments with Sunn hemp fibre.** *Fmg S. Afr.* **23.** 472-80. 1948. **628**

Experiments with Sunn hemp fibre have been necessitated by the desire to gain information in respect of decortication, the retting process, fibre yield per morgen, quantity of seed needed per morgen, and the stage at which the plants should be reaped to assure the maximum yield of fibre.

Methods of harvesting, and various experiments carried out with the fibre in relation to the above information required, are discussed, with particular stress on the relative merits of stagnant or running water for effective retting, and the length of time required for the latter. The decortication of dry stalks after machine retting has proved to be economically possible.—J.T.B.

KOCH, P. **The bag problem. A summary of the possibilities of fibre production in the Union.** *Fmg S. Afr.* **23.** 461-71. 1948. **629**

There is a serious bag shortage in the Union, and there appears to be little hope of supplementing requirements from elsewhere, as there is a world shortage of jute and similar bag making fibres. Bag factories have been built, and experiments with fibre plants, which could be grown on a large scale within a few years in the Union, have been carried out with encouraging results. The morphological and economic classifications of fibres, and how their general characters may be distinguished, are given and the main fibre-producing plants are discussed.

It is concluded that an early solution to the bag problem seems possible for the time being, by the exploration on a large scale of *Phormium tenax* and the ' wilde stokroos ' species.—J.T.B.

COHEUR, C. Essais de rouissage sur *Urena lobata.* [**Retting trials on** *Urena lobata.*] *Bull. agric. Congo belge* **39.** 841-54. 1948. **630**

A series of trials have been carried out at Obiatuku, Territory of Ponthierville, in order to study fibre extraction from *U. lobata*, a long and heavy process which is carried out by the natives. In examining the convenience presented by this crop, comparison is made with *Abroma augusta* and raffia.—E.B.

PINARDI, G. Producción y caracteristicas de fibras textiles de alta calidad a partir de los excedentes agrícolas, con especial referencia a posibilidades argentinas. [**Production and characteristics of high-grade textile fibres from agricultural by-products, with special reference to possibilities in Argentina.**] *Experimenta* **1.** 33-7. [English, French and Italian summaries, p. 37.] 1948. [Inst. Cienc. Puras, Univ. Nac. Cuyo, Mendoza, Argentina] **631**

The chemical aspect of the subject is discussed with special reference to the production of nylon from such material as oat and cotton seed husks, bagasse, and maize and flax refuse.—G.M.R.

NORTH CAROLINA Agricultural Extension Service. Ext. Circ. No. 321. **Suggested plan for the large southern Piedmont cotton farms.** By *C. B. Ratchford.* 1948. pp. 12. **632**

Suggested adjustments to farming practices, crop yields, and rates of livestock production ending in increases of income and more effective soil conservation, are described in this report. The advantages and disadvantages of three alternative systems:—cotton/live stock; cotton/small grain and live stock/small grain, available to the large farmers are described. The operator's preference, markets available and the particular farm should determine the system followed. With the possible mechanization of cotton manufacture on large farms, acreage of cotton and other row crops should not exceed the point of sound land use and long-time soil conservation.—K.O.

MACHACEK, J. E., and GREANEY, F. J. **Summary of co-operative experiments on treatment of flax seed.** *Phytopathology* **38.** 803-7. 1948. [Dept. Agric. Ottawa] **633**

Tests of seed treatments (New Improved Ceresan, Semesan Jr., Dubay 1452F, Spergon, Arasan) on intact and fractured flax seeds in 1944-46 over a wide area of Western Canada and north United States, indicate the usefulness of seed dressing, particularly when the seeds were fractured. Germination was generally increased by the treatment and yields were occasionally increased. New and Improved Ceresan at the rate of 1.5 to 2 oz. per bu. appeared to increase the yield to the greatest extent ; a dressing of 1 oz. per bu. at least is necessary, contrary to the 0.5 oz. dressing generally recommended in the States.—K.J.S.

STATENS Forsøgsvirksomhed i Plantekultur. Medd. 401. Forsøg med Ukrudtsbekæmpelse i Spindhør 1939-1944. [**Experiments in control of weeds in fibre flax (in Denmark) 1939-1944.**] 1947. pp. 4. **634**

The experiments, which were conducted at the Danish State Experiment Stations with the variety Stormont Cirrus, and which were all carried out on well cultivated and well manured soil, fall into 2 series. In series 1, horse hoeing, harrowing and spraying with blue vitriol solution were tested; in series 2, the effect of dusting with calcium cyanamide was investigated. In both experiment series the flax straw was treated by green scutching. The scutching flax and the scutching tow were evaluated in the scutching mill and a total value figure for scutching flax and scutching tow was computed. On the basis of the results obtained and observations in connexion with the experiments the following deductions can be made regarding the control of weeds in fibre flax.

In horse hoeing one has an excellent means of cleaning flax fields, when the flax is sown in drills 15 cm. or more apart. It is effective against all weeds. Horse-hoeing should be carried out when the flax plants are 5 to 8 cm. high. The weed harrow also destroys some weeds, but it must be used with care, as it may injure the flax, especially on loose soil. Weed harrowing should be carried out when the flax plants are 2-4 cm. high, and always along the rows.

The effectiveness of spraying with 3 per cent blue vitriol solution depends *inter alia* on the kind of weed stand. If this consists preponderantly of *Brassica campestris* and in part of *Polygonum convolvulus*, excellent results can be counted on, particularly if spraying is carried out before the weed plants are too large. To avoid injuring the flax, spraying should take place before the plants are 8-10 cm. high.

Dusting with calcium cyanamide has a similarly good effect against *Brassica campestris* and *Polygonum convolvulus* and is the only one of the chemicals tested which has had a signficant effect against *Chenopodium*. As calcium cyanamide causes serious injury to flax it should be used only where *Chenopodium* is present in large amount, and only at the rate of 50 kg. per ha. Dusting should be carried out in calm weather in dew.—R.P.J.

SCHMITZ, G. Insecticides à base de DDT. Aperçu des premiers résultats obtenus au Laboratoire d'Entomologie de Bambesa. [**Insecticides based on DDT. First results obtained at the Bambesa Entomological Laboratory.**] *Bull. agric. Congo belge* **39.** 855-62. 1948. **635**

In laboratory trials, powder containing 5 per cent DDT has proved to destroy completely larvae and adults of *Helopeltis* of cotton. Results of field trials for the control of this insect with " Gésarol " and pyrethrum powder are tabulated. High cost prohibits their use on the fields.—E.B.

FARMER'S WEEKLY BLOEMFONTEIN. **Control of sunn-hemp wilt disease.** *Fmr's Wkly, Bloemgontein* **76.** p. 93. 1949. **636**

The report based on information from Science Bulletin No. 255, " A wilt disease of *Crotalaria juncea* (sunn-hemp) by A. F. Hean, gives a detailed description of the symptoms and spread of the disease.

The most efficient control measure is a crop rotation for 3 years with rotation plants not susceptible to the disease. Direct soil treatment though effective for greenhouse and trial plots is expensive. Indirect treatment through plant sanitation and seed treatment with fungicidal dusts to prevent early fungal attack on the young seedlings, is also effective.—K.O.

KLEIN, R. M., and LINK, G. K. K. **Influence of 2,4-dichlorophenoxy-acetic acid on initiation and development of hypocotyledonary buds of decapitated flax.** *Bot. Gaz.* **109.** 494-501. 1948. [Univ. Chicago] **637**

There was an inverse relation between concentration of the acid in lanolin paste and the number of buds formed. Inhibitions began with concentrations of 0.001 p.p.m., and above 75 p.p.m. the acid was markedly toxic and inhibitory. 2,4-D was effective in lower concentrations than was indoleacetic acid. It is postulated that the surface area available for entrance of a growth regulating substance (designated as " presentation area") is a factor in determining the degree of response to that substance. The physiological state of the plant is also an important factor, and variation in the initial physiological state accounts for variations in responses between plants.—D.B.

РАКИТИН, Ю. В. и ОВЧАРОВ, К. Е. Ростовые вещества как возможное средство борьбы с опадением коробочек у хлопчатника. *Доклады Акад. Наук СССР* Том 59. *No.* 9. стр. 1665-8. 1949.

RAKITIN, Ju. V., and OVČAROV, K. E. [**Growth substances as a possible means of controlling boll-shedding in cotton.**] *Doklady Akad. Nauk. SSSR.* **59.** 1665-8. 1948. **638**

The work was carried out during 1947 in a kolhoz of the Stalinabad Province, Tadžik SSR. Evidence was obtained that treatment with the substances tested (2,4-dichlorophenoxyacetic acid, naphthoxyacetic acid and naphthylacetic acid) in specific concentration lowers the amount of bolls shed and increases crop yields. Treatment should be carried out after the bolls are numerous, because a dose of the growth substance suitable to lessen boll shedding may have harmful results on some reproductive processes of the plant.—M.H.

PRESLEY, J. T., and LEONARD, O. A. **The effect of calcium and other ions on the early development of the radicle of cotton seedlings.** *Plant Physiol.* **23.** 516-25. 1948. **639**

Radicles of cotton seedlings transferred from blotting paper to tap or distilled water suffered breakages and in nutrient solutions the amount of injury differed with the nature of the cations: in presence of magnesium potassium or sodium salts breakdown was rapid but in presence of calcium the radicles remained healthy. Upland varieties of cotton were more sensitive to calcium deficiency than oats, maize, peas, soybeans, peanuts, etc.; necessary conditions for producing healthy cotton seedlings are adequate moisture during germination and adequate calcium during early growth. Cotton may be a useful species to use in calcium-deficiency experiments.—K.J.S.

CHEVALIER, A. Systématique des cotonniers cultivés ou ayant été cultivés anciennement en Afrique tropicale. [**Systematics of cotton plants cultivated or that have been formerly cultivated in tropical Africa.**] *Rev. Bot. appl.* **28.** 228-41. 1948. **640**

The author makes a critical review of the literature on the subject and examines the present situation of systematics on the basis of recent works. All cotton varieties cultivated in Africa originate from America (species with 26 chromosomes) or from Asia (species with 13 chromosomes). The latter group includes only two species: *Gossypium arboreum* and *G. herbaceum.* American cottons are also reunited in two species: *G. hirsutum* and *G. barbadense.* The last part of the article deals with the cotton varieties at present cultivated or sub-spontaneous in West Africa. It is observed that the indigenous or naturalized forms have disappeared to a great extent.—E.B.

GULATI, A. N. **A method for distinguishing and estimating Mollisoni and P.A.4F. cottons in mixture.** *Indian Cott. Gr. Rev.* **1.** 195-8. 1947. [Technological Lab., Matunga] **641**

The practice of mixing inferior cottons with superior types is deplorable and the present method for detecting constituents in a mixture will help to overcome this prevailing malpractice. The Mollisoni and P.A.4F cottons belong to the two distinct botanical species *Gossypium arboreum* var. *neglectum* forma *bengalensis* and *G. hirsutum* respectively. Earlier work on distinguishing cottons of different origin is described and the principal differences between the present two cottons are observed. A standardised procedure for applying Victoria blue stain is described and results of trials using this technique show a high degree of accuracy.—M.E.E.

RODRIGO, América del Pilar. Los "Hibiscus" de la flora argentina (Malvaceae). [**The** ***Hibiscus*** **species of the Argentine flora.**] *Rev. Mus. La Plata* **7** Bot. No. 29. 111-52. 2 pls. 1948. [Dept. Bot., Mus. La Plata, Argentina] **642**

In this taxonomic study of the six species and one variety of the genus *Hibiscus* found in Argentina, three of them recorded for that country for the first time, it is noted that no use is made of this plant at present, but at least one species, namely *H. cisplatinus,* has a fibre resembling that of flax which would probably be of industrial value. The distribution of the species in Argentina is mapped.—G.M.R.

SUGAR BEET

OTTOSSON, A. Betkampanijen i Östergötland. [**The beet campaign in Östergötland.**] *Lantm. Svenskt Land.* **32.** 788. 1948. **643**

The number of growers in 1948 was 1231 compared with 811 in 1947 and the cultivated area 1426 ha. as against 915 ha. Delivery of clean beets was 42,275 tons compared with 23,297 tons in 1947 corresponding to a hectare yield of 29.6 tons in 1948 compared with 25.5 tons in 1947. The sugar content this year was 18.02 per cent compared with 19.52 per cent in 1947. The dry matter content of the beet pulp was 11.3 per cent as against 11.87 per cent in 1947. The yield of tops was 28 tons per ha. this year compared with 15 tons per ha. in 1947.—R.P.J.

HANSSON, O. Betkampanjen på Gotland. [**The beet campaign in Gotland.**] *Lantm. Svenskt Land.* **32.** 804. 1948. **644**

The sugar beet area in Gotland in 1948 amounted to 2097 ha. (2331 ha. in 1947) and the number of growers to 3047 (3206 in 1947). In 1948 Gotland occupied first place in the country as regards sugar content of the beet, the final result being 18.76 per cent. The yield was 29,487 kg.

beets per ha. (29,190 in 1947). The total crop was 61,850 tons of beets (68,035 tons in 1947).—R.P.J.

ÅSTRAND, H. Utmärkt resultat av 1948 års sockerbetsodling. [**Excellent results from sugar beet cultivations in 1948.**] *Lantm. Svenskt Land.* **33.** 19-29. 1949. **645**

The actual beet area in Sweden was 47,551 ha., a reduction of 1.4 per cent from 1947 and 13.2 per cent from 1946. An increase in the number of plants per ha. from 63,000 to approximately 70,000 was recorded. The mean yield for the whole country was 380 dt. per ha. with 17.47 per cent sugar content. Gotland had as usual the highest sugar content, 18.76 per cent. Hököpinge had the highest yield of beets, 434 dt. per ha.—R.P.J.

GRONINGEN, Commissie ter Bevordering der Suikerbietenteelt Rapport 1943-1945. [**Report of the Commission for the Promotion of Sugar Beet Growing, 1943-1945.**] *Med, Inst. rat. Suikerprod.* **15.** 1.-29. [Separate mimeographed English summary.] 1946. **646**

The report treats successively : (1) Sugar beet yield in the northern provinces of the Netherlands. Root yield was as good as in 1942, and sugar content was 1 to 1.5 per cent greater. (2) A manurial trial in its 15th, 16th and 17th trial years. (3) A spacing experiment combined with trial of two different quantities of nitrogenous fertilizer. (4) Experiments with different quantities of nitrogenous fertilizer. (5) A trial of green manure, in which red clover grown after rye was more effective than 40 kg. N. per hectare. (6) Manurial trial with potassium and phosphorus. (7) Experiment in storing beet in clamps from the autumn of 1944 to about June, 1945. The weight of the beets decreased on an average by about 16 per cent, and sugar content by 0 to 3 per cent.—G.M.R.

PINA, R. Fernandez. Riegos. Temas remolacheros. [**Irrigation of sugar beet.**] *Ager Madrid* **4.** 23-4. 1948. **647**

It is considered that for normal development sugar beet requires 600-700 kg. of water per sq. m. Only in a few districts of Spain, mainly in the North, is rainfall sufficient, elsewhere sugar beet is grown on irrigated land. The quantity of water required varies with the type of soil and it is lower with good preparatory works for irrigation. These works consist in the formation of plots or of furrows. Plots are considered more effective; they are limited by ridges and have a rectangular shape with the longer side in the direction of the furrows. Instructions are given on the preparation of the plots (which should be 9-10 m. × 20-30 m.) and on distribution of water. An excessive supply of water causes a decrease in sugar content. It is advisable to irrigate at night. Data of irrigation water required by sugar beet on four different types of soil are reported.—E.B.

PINA, R. Fernandez. Las alternativas en el cultivo de la remolacha. [**Rotations in sugar beet cultivation.**] *Ager Madrid* **4.** 54-5. 1948. **648**

In many Spanish districts sugar beet cultivation has been repeated consecutively for 10-15 years and even more, because of the economic advantages of growing this crop. In order to avoid exhaustion, of the soil, it is necessary to adopt a rotation of crops. Advice is given to farmers for choosing a rotation, and several rotations already followed on irrigated and dry land of different Spanish regions are suggested. Sugar beet cultivation must always follow a winter fallow also in the case of transplantation, so that a good working and manuring of the soil can take place. The preceding crop should be in preference a leguminous plant.—E.B.

UNITED STATES Department of Agriculture. Circ. No. 779. **Effect of crop rotation and manure on the yield and quality of sugar beets, United States Scotts Bluff (Nebr.) Field Station. (1930-41.)** By *S. B. Nuckols* and *L. Harris*. 1948. pp. 20. **649**

Results are presented of a 10-12 year study of 24 different crop rotations that included beets. Some rotations without legumes or fertilizers led to poor yields and stands. Legumes increased weights of roots to a degree which offset a slight lowering of sucrose percentage ; this was also true of manure applications of 12 tons per acre. Continuous cropping gave very low yields of beets (5.65 tons roots) averaging 18.13 per cent sucrose. Alternation of intensive crops produced an average of only 7.79 tons per acre, sucrose 17.76 per cent. Inclusion of lucerne or sweet clover in 4-course rotations produced notable yields of gross sugar ; lucerne could be grown for 2 years in a 4-course and for 3 years in a 6-course rotation. The addition of manure to short rotations doubled the yield of gross sugar, but rich intensive rotations are not suited to the average farm. The 6 and 7-year rotations which included lucerne and in which manure was applied to the beet crop contributed to increased soil fertility; they yielded 17 tons of beet per acre averaging 15.9 per cent sucrose.—K.J.S.

GINNEKEN, P. J. H. van. De allometrische wet. Toepassing en uitbreiding. **The allometric law. Application and extension.** *Med. Inst. rat. Suikerprod.* **15.** 153-299. [English and French summaries, 292-9.] 1947. **650**

A discussion of its application to variety trials with sugar beet.—G.M.R.

HINE, H. J. **Harvesting sugar beet.** *J. Min. Agric.* **55.** 385-7. 1948. [Min. Agric. and Fish.] **651**

The report outlines some of the types of sugar beet harvesters shown in recent demonstrations in Great Britain.

An advantage of separate machines over complete harvesters is that between the first operation of topping and second of lifting the roots, the tops can be collected free of dirt and fed to stock or ensiled.

A British type of combine harvester working accurately delivered the beets to a trailer running with the machine and types of American combine harvesters were adapted to conserve the tops by putting them into separate windrows for picking up clean. Horse-drawn Danish machines doing separate harvesting operations were favourable in Norfolk and Lincolnshire demonstrations. A pair of machines for topping and lifting separately is being made in Britain from Swedish designs. The components of one British harvester are arranged so that the elevator can be used as a loader filling lorries from clamps. This extended usefulness is important, for anything that increases the period over which a machine can be worked per season reduces the cost of mechanization.—K.O.

AGRICULTURAL ENGINEERING RECORD. **Cleaning and shredding sugar-beet tops.** *Agric. Engng Rec.* **2.** 150-1. 1948. [N.I.A.E., Silsoe Beds.] **652**

The report illustrates the two types of washing and shredding machines used in Germany. The larger washing plant is a modification of the smaller portable system and is used where a natural supply of water is available. The smaller washers are fed by a piped water supply. There is a difficulty with the larger installation with the disposal of the effluent water which is toxic to fish.

The increased moisture content of the tops brought about by washing, can be reduced by squeezing before drying and this reduces the drying effort by one-third but this advantage may be offset by losses up to 15 per cent of the soluble carbohydrates.

On smaller farms tops are well cleaned by cheaper shaking machines, working on the same principles as straw shakers in a thrasher, and shredding machines of the peg drum type.—K.O.

AGRICULTURAL ENGINEERING RECORD. **Precision drilling of sugar beet in America.** *Agric. Engng Rec.* **2.** 131-8. 1948. [N.I.A.E., Silsoe, Beds.] **653**

In America, seed processing is regarded as a temporary measure to overcome the disadvantage of natural seed clusters until plant breeders produce seed with reduced number of germs. Present work is concentrated on improving field germination of processed seed and the characteristics of precision seeders that affect germination. Account of original developments in seed dressing and comparison of field germination of natural, segmented and rubbed seeds under dry conditions shows the latter give higher germination after 20 days.

All American commercial processing machines produce "rubbed seeds," and trials are in progress which produce smooth, spherical seeds of uniform weight, with pelleting material which readily disintigrates in soil, and which enables one seeder to sow several kinds of root and vegetable crops.

The report describes and illustrates extensive drill development work at the California Agricultural Experimental Station at Davis. Comparative tests on greased boards were made with 6-plate type seeders: three with vertical plates, Rassman, Cobbley, and Milton, and three with horizontal plates, John Deere 55 and 66 and International 40.

Results showed that an increase of 100 per cent in speed of one rotor resulted in 40 per cent increase in seeding rate. Broken seed is unlikely to germinate and interferes with seed fill. Proportion of seed damaged by grinding was lowest at speeds giving 100 per cent fill. Adaptations to machines, improving spacings of seeds after leaving the cells, are in progress.

Good preliminary cultivations with normal harrowing just before planting is best. A disk opener with a runner between disks for smoothing, and a boat opener for consolidating the furrow gave better germination than the shoe type of disk alone. Seeding units should have a selection of three depth bands to give normal depths of 1 in., 1.75 in., and 2.5 in., and early sowings when germination is slow and moisture excessive, should be shallow, but later sowing, when germination is rapid and conditions dry, should be deeper. Germination was increased by a steeply, bevelled, V-rim press wheel, and a device between the disk openers which covered the seed with moist soil from the furrow bottom before the dry soil fell in. K.O.

DECOUX, L. La mécanisation de la culture de la betterave. Les expériences des deux dernières campagnes. [**Mechanization of cultivation of the beet. Experience of the past two seasons.**] *Sucr. belge* **67.** 277-90. 1948. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont] **654**

Conditions following the second world war have made mechanization imperative. For this reason a department of machinery has been formed in the above-named institute. An account is given of its activities for the years 1946 and 1947. Machinery under trial includes the tractor, plough, manure distributor, and equipment for sowing, seed segmentation, seed polishing, seed calibration, spacing (lines 40 or 50 cm. apart), mechanical hoeing, and for spreading herbicides.

The present account deals chiefly with lifting of the crop. Machines of various makes for both large scale and small scale cultivation are described and illustrated, also machinery for combined lifting and topping. Losses in terms of sugar and costs are discussed. Figures show that as regards harvesting of beet Belgium is the least mechanized of western European countries.—D.B.

DECOUX, L. La mécanisation de la cultures de la betterave. Les expériences des deux dernières campagnes. [**Mechanization of cultivation of the beet. Experience of the past two seasons.**] *Sucr. belge* **67.** 317-27. 1948. [Inst. Belge pour l'Amélioration de la Betterave, Tirlemont] **655**

See previous abstract.

Transport is considered in this paper. The vehicles required are trailers, scuttles and lorries mounted on low pressure pneumatic tyres. Devices for unloading by tipping, by crane and grab or with a net are described and illustrated. There is also a net for unloading the green beet tops. Costs are discussed. A warning is given of the deterioration of the soil due to lack of humus when the horse is completely replaced by the tractor.—D.B.

ITERSON, J. van. Eenige statistische beschouwingen over suiker. [**Some statistical observations on sugar.**] *Ber. Afd. Handelsmus. Kol. Inst.* No. 201. *Tijdschr. Ned. Aardrijksk. Gen.* **61.** 171-91. 1944. [Received 1948] **656**

The author presents a comparative statistical review of the production and consumption, export and import of sugar, both beet and cane, in all parts of the world from the period before the second world war up to 1943.—G.M.R.

VAN HEEL, J. P. D. Graines de betteraves calibrées. [**Calibrated seed of beet.**] *Sucr. belge* **67.** 219-20. 1948. **657**

Segmentation is brought about by placing the tufts between a disk of carborundum revolving at high speed and a steel bar which cuts them. The cost of segmented seed is double that of unsegmented seed, but only half the quantity is required. The cost of seeding is therefore the same. Cultivation expenses are reduced by the precision of the sowing which makes thinning of plants unnecessary. An adequate seeding rate is 7 kg. per ha.

In Western Europe a difficulty arises when the segmented seed remains in the ground some time before germinating as during a cold damp spring and in heavy, dry soil. The seed is then subjected to attack by pests which penetrate the broken surface. Seeds have been polished to give them a smooth even surface. In North America this difficulty does not occur because the seed is sown on irrigated land and it germinates within 3 days.—D.B.

USCHDRAWEIT, H. A. von. Die Bekämpfung der Wanzen—Kräuselkrankheit der Futter—und Zuckerrübe. [**Control of bug-curl disease in fodder and sugar beet.**] *NachrBl. dtsch. PflSchDienst.* **9.** 134-7. 1947. [Biol. Zentralanstalt, Berlin-Dahlem] **658**

The disease is caused by a virus which is carried by *Piesma quadratum*. It can be controlled by destroying the bugs by the "strip trap" method. This method consists of a pre-sowing of a strip of land near or on the beet field. The sowing must be done when the bugs are migrating from their winter quarters to the beet field. When the insects have been attracted there they are destroyed by ploughing up or burning. This is done in the morning when the insects are stiff and slow of movement. The sowing proper follows. In spite of loss in yield due to the 5 to 6 weeks' delay in planting enforced by this method of control, yield is higher than it would be if the crop were infected by the virus. It is particularly necessary to take precautions during a dry year.—D.B.

MORTON, A. G., and WATSON, D. J. **A physiological study of leaf growth.** *Ann. Bot., Lond.* **12.** 281-310. 1948. [Rothamsted Expt. Sta., Harpenden, Herts] **659**

The effect of nitrogen, sodium chloride and water supply on leaf growth was investigated in two varieties of sugar beet grown in pot culture. The rate of production of leaves by the apical meristem was increased by increasing the external nitrogen supply, but was unaffected by salt or water supply in the experimental conditions. The number of cells in the individual leaf of one variety was increased with increase in nitrogen and in water supply but was decreased by application of salt. In the other variety water supply had no effect on the number of cells in the leaf (nitrogen and salt not tested).

Cell size in the leaf showed evidence of considerable variation with external conditions, especially water supply, but no conclusions can be drawn from the limited data. The number of cells in the leaf is greatly reduced when the initials rise in complete darkness, although such leaves are capable of normal cell extension, if returned to light soon enough.

The effects of the treatments on yield and leaf area were examined. Net assimilation rate was unaffected by external nitrogen supply, although there was some evidence that it is not independent of the internal nitrogen level. Net assimilation rate is generally reduced by low water supply and is affected in a complex manner by salt.

Examination of material from field crops shows that the extent to which cell number and cell size in the leaf are affected by manurial treatment may vary considerably with different species.—From authors' summary.

ROOT CROPS

AGRICULTURA TROPICAL. Triplique su producción de yuca. [**Treble your production of cassava.**] *Agric. trop.* **4.** No. 3. 15-6. 1948. **660**

A Trinidad grower of cassava (*Manihot*) discovered accidentally that the planting of cuttings 1.20 to 1.50 m. long instead of the 25 to 30 cm. cuttings previously used, resulted in the trebling of his crop. In addition to greater yield, the new method has the following, among other advantages: the field needs only one cleaning, it is not necessary to plough furrows, the crop is ready to harvest in 4.5 or 5 months instead of 9. Colombian farmers are invited to experiment with the new method.—G.M.R.

Scheygrond, W. Rassenproblemen bij voederbieten. [**Racial problems in mangels.**] *Landbouwk. Tijdschr.* **60.** 406-13. 1948. [Govt. Inst. for Research on Varieties of Field Crops, Wageningen] **661**

Of the area occupied by mangels (or fodder beet) in 1947 in the Netherlands, about 55 per cent was planted to high or very high content varieties, and 45 per cent to low content varieties, the former principally on the marine clays, the latter on the river clays and sands. The importance of choice of definite strains or races of mangel is emphasized. Within the different varieties there is a considerable amount of racial variation, as, for example, in the high content "Green Crown" (Groenkragen), the variety most commonly grown in the Netherlands, in which there are differences in the yield of dry matter of as much as 10 to 15 per cent according to strain. A difference of 10 per cent can make a difference of f.100 to f.150 per hectare to the grower, at present prices.

The author discusses the characters of most significance for the valuation of strains or races. (a) Yield, in which it is the yield of dry matter per unit area which is important. In the case of mangels a close correlation exists between the figures obtained from refractometer readings of sap samples and those obtained from determining the dry matter content of 10-grm. pulp samples. This correlation must be determined for each field separately, after which it is possible to take refractometer readings for a whole field and then to convert the readings into the figures for dry matter content. The as yet unsolved question of whether the refractometer readings may not be a better measure of nutritive value than the figures for dry matter content is discussed. (b) Lack of tendency to bolt. This is of great importance, because early sowing produces a considerable increase in yield but at the same time, especially in the northern provinces, tends to encourage bolting. (c) Harvesting. Post-war labour shortage makes varieties which pull up easily without much earth adhering to them of special value, but this character, unfortunately, is not always combined with high content. Attempts have been made in Denmark to cross readily harvested and high content varieties, and the resultant varieties are already in use in that country. (d) Keeping properties. Tests in trial clamps have shown varietal differences to exist. In general, all varieties keep better if not lifted too early and if some earth is left adhering to the root. Early sowing, also, probably increases storage value. (e) Uptake of and requirements in plant nutrients. Experiments have shown that in order to attain maximum productivity, low content varieties require more nitrogen than do high content varieties. It is not yet clear whether storage value deteriorates or not under the liberal application of N. Great varietal differences appear to exist in the uptake and distribution of K and Na. The utilization of K and Na. is generally more economic in high content varieties, in which, also, these elements migrate especially into the leaves, so that with the subsequent ploughing in of the leaves (as is customary in some parts of the Netherlands) the K and Na again come into circulation. (f) Resistance to disease. Varietal differences in this respect are insignificant.

Finally the author describes the organization of trial fields in the Netherlands and the influence of climate and soil type on varietal behaviour.—G.M.R.

CROP PHYSIOLOGY

Woodford, E. K., and Gregory, F. G. **Preliminary results obtained with an apparatus for the study of salt uptake and root respiration of whole plants.** *Ann. Bot., Lond.* **12.** 335-70. 1948. [Res. Inst. Pl. Physiol., Imp. Coll. Sci. Tech. London] **662**

The apparatus described was devised to ensure the sterility of the culture medium during the course of the experiment, to maintain a predetermined oxygen tension around the roots, and to avoid diffusion effects in the solution by keeping the culture medium well stirred. In practice the results indicate that these ends were achieved. In this work for the first time a factorial experiment has been carried out in which the effects of oxygen tension and nutrient concentration have been explored simultaneously over a wide range and thus a study of the interaction of factors has been possible.

The plant material used was standardized and the external factors of light and temperature were maintained within reasonably constant limits, but even so variation among the batches of plants used, both in development and function, was considerable.

It is unfortunate that some of the necessary data for a full investigation of the factors controlling salt uptake were not collected. The circumstances made this impossible. Thus the concentrations of the salts in the cell-sap of the plants are not known and therefore the degree of accumulation of the ions studied cannot be assessed.

No data on the carbohydrate content of the roots are available.—From authors' discussion.

Stout, P. R., and Meagher, W. R. **Studies of the molybdenum nutrition of plants with radioactive molybdenum.** *Science* **108.** 471-3. 1948. [Univ. California, Berkeley] **663**

Experiments with radioactive isotyopes Mo^{93} (half-life 6.7 hrs.) and Mo^{99} (h.l.-67 hrs.) on tomato plants grown in complete nutrient solutions are described. The distribution of molybdenum in the tissues differs from that of K and P and also that of Mn and Zn. Roots accumulate molybdenum rapidly even from concentrations of only 1 part per billion and less; translocation is also rapid but the amounts of molybdenum translocated are governed by the concentration of P ion in the culture solution. It appears that molybdenum is not accumulated by actively metabolizing cells near the vascular tissue in the upper parts of the plant, but goes to the areas having the greatest number of stomata, i.e. it may be left at points of greatest water loss. An alternative suggestion is that molybdenum is lightly held by plant compounds which are involved in metabolic processes peculiar to or more active within, the interveinal areas of the leaf.—K.J.S.

Jealott's Hill Research Station. Bull. No. 7. **A guide to the uptake of plant nutrients by farm crops.** By *D. J. Halliday.* 1948. pp. 34. **664**

Data of N, P, K. Ca and other mineral contents of crops at different stages of growth have been extracted from all available literature and are tabulated. Diagrams based on these data show clearly the period at which these elements are taken up (or discarded) by the particular plant. For example, wheat sown in October and harvested in August takes up all its nutrients at the highest rate between mid-May and mid-June, i.e. one to two weeks earlier than the period of maximum growth. Uptake of potash and chlorine ceases at the end of June after which there is a return of these nutrients to the soil either by migration downwards and through the root or by leaf fall. N, P, and Mg continue to be absorbed up to harvest. Ca return to the soil is only slight. In terms of fertilizers, nitrogen equivalent to 0.8 cwt. nitro-chalk is taken up between October and the end of April and the equivalent of 1.4 cwt. N/C during May, June and July, mainly at mid-June. Similar data are given for the principal farm crops and it is hoped that the bulletin will guide farmers in designing their fertilizer programme on the most efficient basis. It is pointed out that the removal of nutrients from soil by growing crops is not the only drain on soil reserves and supplies; allowance should be made for losses due to leaching of soluble salts by rain, soil erosion fixation of P (and K) in the soil complex, weed competition, etc.—K.J.S.

Wallace, T. **Nutrition of farm crops.** *Fmg* **2.** 335-8. 1948. **665**

Recent problems concerning nutrition of crops, arising due to changed conditions of cropping, and practices on general farms, and to the development of intense cropping systems on holdings specialising in fruit and vegetable crops, are outlined.

Points dealing with the particular problems of a number of important farm, market garden, and fruit crops are given, stressing mineral requirements, and the importance of maintaining the organic matter content of farm soils.

Organic manures, fertilizers, lime and practical methods of applying nutrients, are discussed. —J.T.B.

Russell, R. Scott, and Martin, R. P. **Use of radioactive phosphorus in plant nutritional studies.** *Nature, Lond.* **163.** 71-2. 1949. [Dept. Agric., Univ. Oxford] **666**

It has been concluded that in experiments with plants and radioactive isotopes there is very little radiation damage with concentrations necessary for tracer investigations. However, as even a small degree of radiation damage could vitiate results of a physiological study, an attempt to define the limits of possible damage is made. From preliminary studies it is concluded that while there are no obstacles to the use of tracers in plant studies which cannot be overcome by careful techniques, there is a hazard of radiation damage. —M.H.

Wadleigh, C. H., and Gauch, H. G. **Rate of leaf elongation as affected by the intensity of the tota. soil moisture stress.** *Plant Physiol.* **23.** 485-951 1948. **667**

Soil moisture stress is defined as the sum of the values soil moisture tension and osmotic pressure of the soil solution (a measure of salt concentration). A mathematical expression is derived for this, and the rate of leaf elongation in cotton plants (a function of turgescence) used to test its validity. The results confirm those of earlier workers in giving values consistently close to 15 atmospheres for the moisture stress inducing leaf-growth cessation for (a) different irrigation cycles during the growth of a given leaf; (b) different leaves on the same plant; and (c) leaves on different plants.—K.J.S.

ФЕДОРОВСИЙ, Д. В. Зависимость коэффициента завядания от вида растений и осмотического давления почвенного раствора. *Почвоведение*, 1948. *No.* 10. стр. 612-21.

Fedorovskiĭ, D. V. [**The dependence of the wilting coefficient on plant species and on osmotic pressure of the soil solution.**] *Počvovedenie* 1948. No. 10. 612-21. **668**

The experimental plants comprised *Cucumis sativus*, *Linum* sp., the Diamant and Sarrubra varieties of wheat, *Salicornia herbacea* and *Salsola mutica*. Differences in the coefficient of wilting are shown by plants with a weak capacity for absorbing water from the soil (cucumber, flax) and also by plants with great absorbing capacity (wheat, *Salsola*). These differences are preserved in the plants when tested with soils of different mechanical structure.

An increase in osmotic pressure of the soil solution produces great increase in the coefficient of wilting for all plants, even the halophytes, but the absence of increased coefficient of wilting in *Salicornia* in saline soils is related to the great accumulation of chlorides in the plant and the corresponding increase in osmotic pressure of its cell sap.—M.H.

CROP BIOCHEMISTRY

РАТНЕР, Е. И. Распределение воды и минеральных веществ в растении и поглотительная деятельность корней. *Почвоведение*, 1948. *No.* 10. стр. 622-9.

RATNER, E. I. [**Distribution of water and mineral substances in the plant and absorptive capacity of the root.**] *Počvovedenie* 1948. No. 10. 622-9. [Timirjazev Inst. Plant Physiol., Acad. Sci., Moscow] **669**

With an increase in the level of mineral nutrients available to the plant, the content of these substances in the roots increases at a greater rate than in plant tops. On the other hand, with a deficient supply of such substances in the nutrient medium, the content in the tops is maintained at a comparatively high level, while the root content is almost depleted. The significance of this phenomenon is discussed in relation to wilting, and to the colloid complex of soil and plant tissues.—M.H.

KOSTOFF, D. **Cytogenetic changes and atypical growth induced by hexachloro-cyclohexane ($C_6H_6Cl_6$).** *Curr. Sci.* **17.** 294-5. 1948. **670**

Some data are recorded showing the suppression of growth of roots or coleoptiles of seedling maize, *Pannicum* sp., pea, hemp, *Brassica nigra* and *Secale cereale*. Cytological studies on maize, wheat and other germinating seeds treated with commercial insecticides show that hexachlorocyclohexane acts first on the cytoplasm and interferes with the cytoplasmic processes involved in cell division. The main features are similar to those induced by colchicine, acenaphthene and other agents causing polyploidy. In *Gramineae*, hexachlorocyclohexane and acenaphthene are about equally active; in legumes the former is more active and swellings resembling those induced by colchicine were obtained in peas. The insecticides are said to affect the chromosomes themselves also, so that degeneration in pure lines may be rapid. At present there is no evidence of a poliploidizing effect on insect cells.—K.J.S.

ENNIS, W. B., Jr. **Responses of crop plants to O-isopropyl N-phenyl carbamate.** *Bot. Gaz.* **109.** 473-93. 1948. [Camp Detrich, Frederick, Maryland] **671**

Morphological changes in plants following treatment with this chemical are described and tabulated and the agronomic applications in control of vegetation are discussed. Thirteen species of the Gramineae behaved similarly on treatment. Root and shoot, instead of elongating, became bulbous and swollen. Dicotyledonous plants were characterized by delayed emergence and stunted growth; some did not develop beyond the two-leaf stage.

There were various manifestations of abnormal cytological behaviour in roots and shoots of treated oat and barley plants. The cytological abnormality was correlated with abnormal development and difficulty of survival.—D.B.

WAYGOOD, E. R. **Adaptation of the method of Lowry and Lopez to the estimation of inorganic and organic phosphate in plant extracts.** *Can. J. Res.* **26.** 461-78. [Dept. of Bot. Univ. of Toronto, Ont.] **672**

For the study of phosphorylations and dephosphorylations, the author confirms the usefulness of the Lowry and Lopez method which employs ascorbic acid as the reducing agent with the Fiske-Subbarow reagents at pH 4.0. Using the Coleman Universal spectrophotometer, model 14, a wave length of 650 mμ has been employed, and a reagent pH of 4, maintained by a sodium acetate—acetic acid buffer. A concentration of 0.25 per cent ammonium molybdate and 0.1 per cent ascorbic acid has proved optimum for maximum colour development in concentration of P up to 24μ gm. P in the final volume. If cell walls are high in silicate they must be removed from the extract. A balance sheet of phosphorus fractions in the wheat leaf is discussed.—K.J.S.

CHINOY, J. J. **A new colorimetric method for the determination of starch in leaves and woody tissues of plants.** *Indian J. agric. Sci.* **7.** 261-8. 1947. **673**

This method shows how starch iodide colour developed by addition of KI and H_2O_2 in amounts to generate slight excess of I_2, is matched in a colorimeter against a standard starch solution, similarly treated, after removal of excess I_2 with chloroform.

Data given, show that starch can be stored for at least a fortnight in 0.7 per cent KOH solution.

Because the accuracy of starch determination in a plant sample is influenced by the size of particles, the sample must be reduced to pass through a 100-mesh sieve.—K.O.

ECOLOGY AND ENVIRONMENTAL STUDIES

LONA, F. La fioritura della brevidiurna *Chenopodium amaranticolor* Coste et Reyn. coltivata in soluzione nutritizia con saccarosio, in assenza di stimolo fotoperiodico euflorigeno. Nota preventiva. [**The flowering of short-day** *Chenopodium amaranticolor* **Coste et Reyn. cultivated in nutrient solution with saccharose, in the absence of a flower-forming photoperiodic stimulus. Preliminary note.**] *Nuovo G. bot. ital.* **56.** pp. 4. 1948. **674**

The plants of *C. amaranticolor* used in these experiments were kept for 20 to 30 days with the roots in a nutrient solution to which saccharose had been added (from 2.5 to 10 per cent). From some of the plants the leaves had been almost completely removed. Control plants were kept in the nutrient solution without saccharose. Day length (April-June) was not suitable for flowering. At the end of the period, flowering was beginning in 80 per cent of the plants without leaves grown in the solution containing saccharose. The plants with leaves grown in the same solution and the control series showed no sign of inflorescences.

The author points out that the substances having a positive influence on flowering, which are elaborated by the leaves and supplied by them to the buds, are normal nutritive substances (it does not mean that sugars are flower-forming substances, but they may be the basic substances for their synthesis). He also considers that the theory according to which the flowering of short-day plants is induced by flower-forming hormones produced by the leaves under a short day (these hormones would not form under a long day) is inadequate to explain the flowering process in relation to photoperiodic factors. It is more likely that the flowering process is subordinated to inhibitory factors which originate in a long-day condition.—E.B.

LONA, F. Esigenze fotoperiodiche dei poliploidi e loro significato ecologico e fitogeografico. Nota preventiva. [**Photoperiodic requirements of polyploids and their ecological and phytogeographical significance. Preliminary note.**] *Nuovo G. bot. ital.* **54.** pp. 793-6. 1947. [Milano, Istituto Botanico dell'Università] **675**

Photoperiodic behaviour of a diploid variety and a fertile tetraploid variety of the short-day *Xanthium italicum* Moretti has been studied. Differences in time of flowering, although not great, have been found, with accentuation of the short-day character in the tetraploid variety. The author is of the opinion that these differences are not to be attributed to modified speed in growth, but to a modified reaction to the stimuli which influence development. The subject is discussed. —E.B.

LONA, F. L'influenza delle condizioni ambientali, durante l'embriogenesi, sulle caratteristiche del seme e della pianta che ne deriva. [**Influence of environmental conditions during embryogenesis on the characteristics of the seed and of the plant derived therefrom.**] *Lavori di Botanica, Padova,* 1947, pp. 313-52. [English summary, 350-1.] [Milano, Istituto Botanico dell' Università] **676**

Trials carried out with *Chenopodium amaranticolor* Coste et Reyn. had the object of studying the influence of photoperiod, light intensity, soil moisture and temperature on seed, from fertilization until complete maturation. The photoperiodic factor is the most important. At the latitude of Milan, *C. amaranticolor*, a short-day plant flowers about 15th September and fruits in October-November. Seeds from plants grown in natural conditions have a germinability of 60-90 per cent. With a suitable flower-forming induction, flowering can take place in summer ; in such a case, the seeds acquire different properties according to the photoperiodic conditions prevailing after complete flowering. With a photoperiod of 6 to 8 hours, germinability is 50-90 per cent ; plants which mature under normal day (16 to 17 hours) or continuous day (24 hours) produce seeds with no or very low germinability (0 to 10 per cent). Also under an artificial summer day of 11 hours, seed germinability is low. The very low germinability of seeds ripened under long summer day, continuous day and also summer day of 11 hours is due to the fact that the integument is very much thicker in comparison with that of seed ripened under a very short day. If the integument is removed, the embryo develops rapidly. The integument is an obstacle to the emergence of the radicle and only to a limited extent to the absorption of water. In studying the influence of temperature, it appears that seeds which ripen under an 11 hour day during October germinate well in comparison with seeds which ripen during June-August in the same photoperiodic conditions. As regards the growth characteristics of the plant derived therefrom, the optimal day length is 16 to 17 hours.—E.B.

LONA, F. Correlazioni di sviluppo e di accrescimento fra parti di una stessa pianta (di tipo longidiurno) tenute in condizioni fotoperiodiche differenti. [**Correlations of development and growth between parts of a same plant (long-day type) kept in different photoperiodic conditions.**]

Lavori di Botanica, Padova 1947. pp. 285-311. [English summary, 308-9.] [Milano, Istituto Botanico dell'Università] **677**

Three series of trials were carried out with *Urtica pilulifera*, a typical long-day plant. One branch of the plant was kept under long-day conditions and another branch under short-day conditions. The following conclusions were reached: (a) the long-day branch grows less than the branches of a plant kept entirely in long day; (b) the long-day branch flowers at the same time as the controls in long day, while the short-day branch remains vegetative like the controls at short day; (c) the presence of leaves in a vegetative condition on the short day branch prevents the passage of the stimulation which determines flowering; by removing these leaves, it rapidly flowers both under long- and short-day conditions; (d) the leaves of the receptor branch, as long as they remain green and functioning, are a strong obstacle to flowering, even if kept in continuous darkness; (e) under very short day (1 to 3 hours in 24), plants or branches grow semi-etiolated or have pale green leaves and show in these conditions neither an anthogenic nor an anti-flowering action. A receptor branch grown in such conditions flowers easily, as it is supplied with flower-forming hormones by the donor branch in long-day; (f) a 5 to 7 hour photoperiod produces an anti-flowering condition in leaves like that in a 9 to 10 hour photoperiod. The leaves are greener in a 5 to 7 hour photoperiod than in a 1 to 3 hour photoperiod.

These findings are discussed with regard to the knowledge of photoperiodic behaviour in long-day plants as compared with short-day plants. It is suggested that a short-day leads to the formation in the leaves of *Urtica* of substances inhibiting flowering.—E.B.

Lona, F. "Chimere funzionali" come conseguenza della localizzazione e autonomia del carattere fisiologico delle foglie in rapporto coi processi di sviluppo della pianta. [**"Functional chimaeras" as a consequence of localization and autonomy of the physiological character of leaves in relation to the developmental processes of the plant.**] *Lavori di Botanica, Padova,* 1947. pp. 277-83. [English summary, 283.] [Milano, Istituto Botanico dell'Università] **678**

A plant, which is sensitive to the photoperiodic factor—especially in experimental conditions—can at the same time have leaves, or part of leaves, which are physiologically different, that is which have the anthotropic and vegetotropic character. In such cases, flowering is effected if there is a certain balance between the influence exercised on buds by these functionally different organs. Trials have been carried out with the short-day plant *Perilla ocymoides* (L.) var. *Nankinensis* (Loor) Voss.—E.B.

Lona, F. Sul comportamento fotoperiodico di alcune specie di *Xanthium.* Brevidiurne che fioriscono a luce continua. [**On the photoperiodic behaviour of some species of *Xanthium.* Short-day plants flowering under continuous light.**] *Nuovo G. bot. ital.* **53.** 635-56. [English summary, p. 656.] 1946. [Milano, Istituto Botanico dell'Università] **679**

Some species of *Xanthium* studied under different photoperiodic conditions have shown a short-day behaviour, with the exception of *X. spinosum* L. Among short-day species, two types have been revealed. The first (*X. italicum* Moretti and *X. strumarium* L.) requires for flowering alternating periods of light and darkness of a fixed relative length; this is the normal common type. The second (*X. echinatum* Murr., *X. orientale* L., and early *X. strumarium*) includes a special group of short-day plants which have no need for alternate periods of darkness; these plants can therefore flower also under continuous light. The fact that both groups belong to the short-day type has been demonstrated by a series of photoperiodic treatments, to which the plants of the second type reacted by accelerated flowering as the photoperiod decreased, in the same way as the normal short-day plants, within the limits in which flowering can take place. This behaviour has been established not only by acceleration or delay in flowering, but also on the basis of number of leaves formed before flowering.

The absence of a critical photoperiod, or in other words the capacity of this special group of short-day plants to flower without intervention of the processes which take place during night is of great importance with regard to the mechanism of the processes which determine flowering in short-day plants as a whole. This problem is discussed. The author considers that the processes of a positive character in flower formation must take place under light, while darkness would have the action, not always necessary, of attenuating a second process, negative to flowering, which also takes place under the influence of light. The theory that, in short-day plants, flower-forming substances are formed only in darkness is therefore not confirmed. —E.B.

Lona, F. Sui fenomeni di induzione, post-effetto e localizzazione fotoperiodica. L'induzione antogena indiretta delle foglie primordiali di *Xanthium italicum* Moretti. [**On the phenomena of induction, after-effect and photoperiodic localization. The indirect flower-forming induction of the primordial leaves of *Xanthium italicum* Moretti.**] *Nuovo G. bot. ital.* **53.** 548-75. 1946. [Milano, Istituto Botanico dell'Università] **680**

Trials have been carried out with *Xanthium italicum* Moretti and *Perilla ocymoides* L. var.

Nankinensis (Lour.) Voss, both short-day plants. The different behaviour of *Xanthium*, in comparison with *Perilla* and other short-day plants, consists in the fact that *Xanthium*, if treated for only a few days with a short photoperiod, flowers in a photoperiod completely unsuitable for flowering, notwithstanding the growth of new leaves. In the other plants, on the contrary, after a short period of induction, these new leaves determine the return of the plant to the vegetative stage (rejuvenescence). With the object of explaining this difference in behaviour, the assumption has been made that the non-treated leaves (formed in an unsuitable photoperiod), under the influence of the leaves inducted by a short photoperiod, have different properties in the two cases. Research has confirmed that in *Xanthium* the very young leaves (a few mm. in length) and the primordial leaves are susceptible to an indirect flower-forming induction of an irreversible nature. (Indirect induction indicates an influence from another part of the plant which has been inducted with an appropriate photoperiod.) As they grow, these primordial organs behave as if they were treated directly with a suitable photoperiod. Mature and even developing leaves are not susceptible to indirect induction. In the same conditions, the young leaves of *Perilla* do not react adversely to an indirect induction of an irreversible nature. At any rate, even if they react initially, they do not maintain, as they develop, any flower-forming property. It has been demonstrated in *Perilla* that if only one half of an adult leaf is treated with a suitable photoperiod, the other half is not indirectly inducted. It is apparent that a plant can have at the same time inducted and non-inducted leaves and behave as a physiological chimaera. Flowering is dependent on the prevalence on buds of the action of inducted leaves or of the non-inducted ones. As both types of leaves maintain their properties permanently (under long photoperiod) it is possible to induce flowering in a vegetative plant by grafting a leaf from a plant that is not able to flower, and it is possible that the grafting of a leaf from a flowering plant has no flower-forming influence on a vegetative plant.—E.B.

ЛЕБЕДЕВ, Д. В. Полынь и соседние растения. (Новая глава из химической биоценологии). *Природа, Москва* 1948. *No.* 9. стр. 63-4.

LEBEDEV, D. V. [**Artemisia in the vicinity of other plants. (A new section of chemical biocoenology**.) *Priroda, Moskva* 1948. No. 9. 63-4. **681**

The author cites the works of Bode (*Planta* Vol. 30. p. 566, 1939) and Funke (*Blumea* Vol. 5. p. 281. 1943). The former drew attention to the retarded growth of *Phoeniculum vulgare* when grown at a distance less than 130 cm. from *Artemisia absinthium*. The inhibition is attributed, not to competition for water or nutrients, but to emanations from the leaf cuticle of *Artemisia*, composed of the glucoside of absinthin ($C_{15}H_{20}O_4$ or $C_{30}H_{40}O_8$). The T-shaped leaf hairs produce an ethereal oil. The oil is exuded in greater quantities in dry, sunny weather. Funke experimented with various plants grown near *Artemisia* and found that *Levisticum officinale* was most sensitive. The significance of these facts is stressed in regard to the biocoenotic relationship of *Artemisia*.—M.H.

BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE F.I.A.T. Fin. Rep. No. 1090. **About inheritance of the blossoming age of early and late blooming summer-annual strains of** *Arabidopsis thaliana*. 1947. pp. 27. **682**

This inheritance was tested on five hybrids of early and late summer-annual *Arabidopsis* strains under approximately constant surroundings under artificial light.—Abstract.

BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE F.I.A.T. Fin. Rep. No. 1094. **Effect of light on the germination of several strains of** *Arabidopsis thaliana* L. **Haynh.** 1947. pp. 23. **683**

Some strains of this species germinate only under light and some germinate both in light and darkness. Although some light-germinating seeds can be germinated in darkness by the application of certain chemicals or temperature cycles, the light-germinating *Arabidopsis* strain Hm. could not be induced to germinate in the dark. After removal or injury of the seed coat, however, germination took place in darkness.

Hybridization of the light-germinating Hm and indifferent strains proved that it is not primarily the seed coat but the inside of the seed which is responsible for the ability to germinate in darkness. It is assumed that the seed coat is of secondary importance in that it does not permit the transmission of the anti-germination catalysts which are formed during germination of light-requiring seeds in darkness.—Abstract.

ARGENTINE REPUBLIC, Ministerio de Agricultura, Instituto de Suelos y Agrotecnia. Tirada Int. No. 10. Difusión geográfica de cultivos indices en la Mesopotamia Argentina y sus causas. [**Geographic distribution of crops in the Argentine Mesopotamia and its causes.**] By *A. L. De Fina* and *A. J. Garbosky*. 1948. pp. 10. 19 maps. 1 graph. [Sub-director (A. L. De F.) and Asst. (A.J.G.), Inst. Suelos y Agrotecnia, Min. Agric., Argentine Republic] **684**

The Argentine Mesopotamia, situated between the rivers Paraná and Uruguay, is composed of the three Provinces of Entre Ríos, Corrientes and

Misiones. On the basis of personal study and information collected in 1945, the presence or absence and degree of success of eighteen horticultural and agricultural crop plants have been recorded for 93 different localities, most of which had 500 inhabitants and upwards and had been in existence for at least 25 years. A system of recording was devised by the senior author in which marks were used as follows: for the cultivation of a plant in abundance, up to 4 marks; for high yield in most years, up to 4; and for the good ripening of fruits and seeds in most years, up to 4, the maximum number of marks obtainable thus being 12. The results of this enquiry are shown in eighteen very clear maps and discussed in relation to the corresponding climatic conditions.

The Köppen, the Thornthwaite-Gonzalez Gallardo, and Knoche's systems of classification were found to give an insufficiently detailed presentation of the Mesopotamian climate, and a division of the region into eight agroclimatic districts has been made by De Fina based on the following data of fundamental importance for the success of a crop: (a) mean temperature of the hottest month of the year; (b) mean temperature of the coldest month of the year; (1) mean rainfall of the hottest quarter of the year; (2) mean rainfall of the coldest quarter of the year. This division is shown in a coloured map. The mean temperatures range from 10° to 28°C., mean rainfall from 50 to 500 mm.

Finally, the distribution and relative productivity of the different crops in the eight agroclimatic districts is shown in a graph.

Of the eighteen plants discussed, the following are of interest here. Cotton (*Gossypium hirsutum*, map 13) finds optimal conditions only on the Paranà in the northwest of Corrientes and in close proximity to the Chaco, where there is a long, hot summer with less rainfall than in Misiones. Maize (*Zea mays*, map 15) is found in all the localities studied, except two in which soil conditions are unfavourable, and its most uniformly good development is under the frequent rainfall of Misiones. Wheat (*Triticum aestivum*, map 16) finds the period of winter cold necessary for its germination and early development principally in the southern Province of Entre Ríos, for which a large number of optimal development records are entered. Oats (*Avena sativa*, map 17) are found in practically all the localities and although grain productivity is frequently more or less mediocre, it improves from north to south and in some parts of central and southern Entre Ríos is satisfactory to very good. Barley (*Hordeum vulgare*, map 18). The regional behaviour of this plant is similar to that of oats, although results are even poorer because barley appears to be still more unfavourably affected than oats by the heat accompanied by humidity which is a frequent characteristic of the Mesopotamian region.—G.M.R.

ARGENTINE REPUBLIC, Secretaria de Aeronautica Boteín Fenológico. [**Phenological Bulletin.**] **No. 1.** 1948. pp. 9. **685**

The Bulletin is modelled on the British Royal Meteorological Society's *Phenological Report*, and data are confined at present to information on certain plants cultivated in the Botanic Garden, Buenos Aires, but it is hoped eventually to make observations in other parts of the country also. In this, the first number of the Bulletin, charts are presented showing (a) shooting and (b) flowering in the plants studied, in relation to the official weather records for the second half (June-December) of 1947.—G.M.R.

PORTÈRES, R. Les plantes indicatrices du niveau de fertilité du complexe cultural édapho-climatique en Afrique tropicale. [**Plants indicating the level of fertility of the edaphic-climatic cultural complex in Tropical Africa.**] *Agron. trop.* **3.** 246-57. 1948. **686**

"Every cultivated plant requires a definite quality of soil in a determinate climatic and biotic environment. A precultural test is often provided by the presence-frequency of plants or associations of plants growing on the soil."

When considering the savanna zone, it is said that in Senegal populations of *Borreria Ruelliae* are characteristic of degraded soils grown with groundnut, while the soils where *Cassia occidentalis* is multiplying are restoring fertility. In Sudan and Guinea *Cassia Tora* has the same function. Soils with *Cenchrus biflorus* are still good for growing millet and groundnut. Other plants considered under this aspect are: *Bauhinia reticulata*, *Faibherbia* (*Acacia*) *albida*, *Combretum micranthum*. Parasite *Scrophulariaceae* seem to have a great importance in judging the grade of soil degradation. Different species of *Striga* parasitizing a wide number of plants are considered, and conditions in which parasitism takes place are described. As a conclusion, it is said that *Striga's* are facultative parasites of cultivated plants not growing in an optimum of conditions because of an alteration in the edaphic-climatic cultural complex. In tropical Africa generally the natives cease cultivation and leave fallow the soils on which the parasite has appeared. Below the isohyet of 1000 mm., the repeated cultivation of a plant ceases when the yield is considered uneconomical and a less exigent crop takes place (from sorghum to early millet then to late millet), until the land is left fallow; *Striga* is used as an indicator in these cultural successions. Cultural methods of control of this parasite are also reported.

Other plants which indicate the level of soil fertility (some having an actual action in restoring fertility) are: *Pennisetum purpureum*, *Pteridium aquilinum* var. *lanuginosum*, *Imperata cylindrica*, *Oryza Barthii*.

An example is given to illustrate the procedure followed in determining soil fertility by vegetation.—E.B.

Lorentz, P. G. La vegetación del nordeste de la Provincia de Entre Ríos. Informe científico. [**The vegetation of the north-east of the Province of Entre Ríos. Scientific report.**] 2nd edn. Introduction and appendix by *J. R. Báez.* Paraná, Argentine Republic: Talleres Gráficos Pattarone y Sors. 1947. pp. 204. 3 pls. 2 maps. **687**

The Paraná Municipal Council of Cultural Activities and the Museum of Entre Ríos have co-operated, with financial aid from the Provincial Government, in reproducing Lorentz' pioneer study of the plant cover of the Argentine Province of Entre Ríos, originally published in 1878. In addition to the floristic study of the Province itself, a study of 1481 plant species for their presence or absence in Entre Ríos, the Monte or thorn woodland of Argentina, and the Argentine sub-tropical region respectively is included. In Lorentz' days practically the only agricultural industry of Entre Ríos was stock raising, and it was he who drew attention to the great fertility of the soil and the advantages that would accrue from using it for crop production (see pp. 23, 31, etc.). There is a short study of introduced plants on pp. 172-3.—G.M.R.

Sivori, E. M. Fisiología del desarrollo en los vegetales. [**Physiology of plant development.**] *Bol. Soc. argent. Bot.* **1.** 81-118. 1946. [Inst. Fitotéc. Santa Catalina, Llavallol, Argentina] **688**

An exposition, based on the literature, of theories on the phasic development of plants.—G.M.R.

Díaz, C. de la S. Los factores fisicos en la consecucion de las cosechas. [**The physical factors affecting the development of crops.**] *Surco* **7.** 18-9. 1948. **689**

The influence of light and temperature on the physiological processes of plant life is exposed.—E.B.

Roodenburg, J. W. M. Daglengte, bloemvorming en bloei. [**Daylength, flower formation and flowering.**] *Vakbl. Biol.* **27.** 65-76. 1947. [Bot. Lab., Univ. Utrecht] **690**

After a short general discussion of the responses of long-day and short-day plants to relative length of day, it is noted that certain winter-flowering greenhouse plants have a very uniform dependence on daylength. They require only a few weeks' short day for the formation of flower buds. One can then produce by means of short periods of short day, under long-day conditions, every possible transition between vegetative and reproductive development. In the use of artificial light the following conditions are necessary: (1) The intensity must be low and well below that for photosynthesis. Sensitivity to daylength varies so much that one plant may require ten times as strong illumination as another. Under natural daylength the effective length of day therefore varies, for which reason the term "physiological daylength" is proposed. (2) The duration of illumination is the decisive factor. A long-day effect can be obtained by the alternation of quite short periods of light and darkness. A short-day effect can be disturbed by a short illumination of high intensity in the middle of the dark period. The optimal daylength for flower formation or flowering can vary very greatly, even in the different short-day types. Here a maximal daylength governs the formation or not of flowers. In the long-day types, it is just the minimum which is the decisive factor. (3) The greatest effect is obtained from light rays from the red end of the spectrum.—G.M.R.

Buenning, E. Die entwicklungsphysiologische Bedeutung der endogenen Tagesrhythmik bei den Pflanzen. [**The importance to plant physiology of the endogenous daily rhythm in plants.**] [contained in] *Murmeek, A. E.,* and *Whyte, R. O.* Vernalization and photoperiodism, pp. 167-74. 1948. [Bot. Inst. Univ. Tübingen, Germany] **691**

Neither the quantity of light, daily duration of light and darkness nor the proportion of light to darkness is a decisive factor in causing flowering. The author advances the theory that there is a rhythm or periodicity which has its origin within the plant itself and which, in conjunction with light and darkness, causes flowering. The theory is built up from the general assumption of the presence of a rhythm in all plant development of which flowering is part; the process of flowering itself is not discussed.

Higher plants exhibit a daily rhythm in the performance of several of their physiological functions. That the rhythm springs from within the plant itself is clear from its not being limited to certain times of day or even to a 24-hour cycle. In some plants the rhythm results in leaf movement which is a useful indicator for following the rhythmic action.

This inner rhythm within the plant consists of two phases: one adjusted to light, the other to darkness. These are denoted as photophile and scotophile respectively. The two phases have different biochemical characteristics. During the photophile phase, the metabolic, synthetic and assimilatory functions are dominant with reduced respiration and reduced acidity. The scotophile phase is catabolic with increase in hydrolysis of starches and of sugars, respiration and acidity. The automatic change from one phase to another is brought about by the protoplasmic conditions which demand a reversal, as when acidity or alkalinity reaches a certain level. The change of phase is not sudden ; the two co-exist, one phase gradually attaining its maximum in its particular characteristics while the other phase falls to a minimum in its characteristics. The daily fluctuations induced by the rhythm result in daily fluctuations in permeability and growth.

Although the rhythm springs from within the plant external stimuli such as light and temperature have a powerful influence on the phases. The influence of light is two-fold. Firstly, the 24-hour cycle of day and night maintains the internal rhythm within the 24 hours and keeps photophile and scotophile phases in step with the periods of light and darkness. Secondly, light promotes the characteristics of the photophile phase and inhibits those of the scotophile phase and conversely with darkness. The regulation of the phases by light is discussed.

The time-lag between stimulation and reaction is explained with the help of clear diagrams. In plants of tropical and sub-tropical origin the photophile phase is established soon after stimulation by light ; in plants from temperate and polar climes the photophile phase may not be established for some hours (often 10 to 12 hours) after light stimulation. The reaction can be followed by observing leaf movement. (Allowing for exceptions, leaf raising is associated with the photophile phase and leaf lowering with the scotophile phase.) The time-lag in leaf movement after light stimulation might prove to be a rapid method of distinguishing between short- and long-day plants.

The second influence of light on the phases (a promoter or inhibitor of characteristics of the phases) explains the inhibition of flowering of short-day plants even in a short day (if the light is given in the scotophile phase, and the flowering of long-day plants when on short day. The theory of physiological rhythm within the plant also explains floral initiation by feeding with sugar or by inhibition of respiration during the photophile phase.—D.B.

Buenning, E. Studien über Photoperiodizität in den Tropen. [**Studies of photoperiodism in the tropics.**] [Contained in] *Murneek, A. E.*, and *Whyte, R. O.* Vernalization and photoperiodism. 161-6. 1948. [Bot. Inst. Univ. Tübingen, Germany] **692**

An article on diurnal rhythm in plants, studied in Java and Sumatra, has been reprinted from *Forschungsdienst* 10. 550-3. 1940, with a short supplement contributed for the present publication. The original article has already been reviewed in *Herbage Abstracts* 15. Abs. 1098. 1945. In the addition, attention is drawn to supplementary work and some practical applications of the author's findings are suggested. One possibility is the production of the seed of European vegetables in the tropics through a short application of additional, low intensity light made during the night at a given time which is readily determinable from the study of the endonomous rhythm of the plant. The same treatment could be applied in equatorial flowering in plants such as *Perilla* and *Soja* which, although short-day plants, flower too soon under the extreme conditions of the tropics and therefore, in the case of soybeans, yield only 600 kg. per ha. as compared with some 2000 kg. per ha. in Manchuria. The study of the plant's rhythm as indicated by leaf movements would make it possible to determine the optimal time of application.—G.M.R.

Lang, A. Beiträge zur Genetik des Photoperiodismus. I. Faktorenanalyse des Kurztagcharakters von *Nicotiana tabacum* " Maryland-Mammut." [**Contributions to the genetics of photoperiodism. I. Factorial analysis of the short-day character of** *N. tabacum* **Maryland Mammoth.**] [Contained in] *Murneek, A. E.*, and *Whyte, R. O.* Vernalization and photoperiodism. 175-89. 1948. [Kaiser-Wilhelm Inst. Biologie, Tübingen, Germany] **693**

An article originally published in *Z. indukt. Abstamm.- u. VererbLehre* 80. 214-9. 1942 has been reprinted, with a supplement in which further literature is discussed. The original article has been reviewed in *Plant Breed. Abstr.* 13. Abs. 258. 1943.—G.M.R.

BOOKS AND PERIODICALS

(*For other books reviewed in this issue, see Abs.*, 438, 460, 483, *and* 492).

BELL, G. D. H. **Cultivated plants of the farm.** 22 × 14. xii + 198. Cambridge: University Press. 15s. 1948. **694**

It is not easy to make agricultural botany interesting to the non-technical reader, but it may fairly be claimed that Dr. Bell has succeeded in describing the crop plants of Great Britain in a style which will appeal not only to the adviser and farmer actually concerned with their production but to the lay reader as well. Possibly this statement may be said to apply more to some of the introductory chapters in which British crop husbandry and British crop varieties are considered against the background of world agriculture, and the problem of producing food and other products of agriculture adequate in both quantity and quality to meet the ever-increasing demand.

According as this demand rises with increasing populations and improved standards of living, so must agriculture as far as local conditions permit become more intensive. Dr. Bell makes the point that improved systems of husbandry demand improved varieties, and the improved high-yielding varieties produced by the plant breeder require high standards of farming if they are to give of their potential best.

The emphasis in this book is on the improved crop varieties available to British agriculture, their characteristics, adaptability to specific soils or climatic environments, their place in rotation, and general cultivation practices. There are chapters on the grass species and strains and on the herbage legumes, now accepted as important "cultivated plants" of the farm, with an important rôle to play in "the development of the temporary ley and its incorporation into some system of alternate husbandry." In addition, all the arable crops are described and discussed in sufficient detail: wheat, barley, oats, rye and mixed cereals, the brassicas, potatoes, sugar beet and mangolds, and the miscellaneous crops such as hops, flax or linseed, buckwheat, maize, sunflower, and the vegetables grown on a farm scale.

The book concludes with a discussion of the need for and problems associated with the proper authentication of crop varieties, and of some modern methods of plant breeding used to produce these varieties.

A feature of the book is the collection of excellent and well-reproduced illustrations.—R. O. Whyte.

MALHERBE, I. de V. **Soil fertility.** 22 × 14. pp. x + 296. Oxford: Geoffrey Cumberlege, University Press. 1948. 21s. **695**

This is an English edition of an agricultural textbook dealing with the principles of soil fertility as applied primarily to South African conditions, which has already appeared in six editions in its original Afrikaans text. It has been written, according to the author, for high school pupils, prospective young farmers and soil conservation officers, university students, and farmers of all ages who may be concerned "in the struggle against the loss of 300,000,000 tons of surface soil which is stated to be erosion's *annual* levy on the Union's heritage; in other words the equivalent of 300,000 acres of top soil."—R. O. Whyte.

BRITISH ELECTRICAL DEVELOPMENT ASSOCIATION. **Electricity on the farm.** 22 × 14. Br. Elec. Dev. Assoc. Lond. pp. 64. [n.d.] **696**

"This book is offered, both to the farmer whose farm is not yet electrified and to the farmer who does not yet make the fullest economic use of electricity, so that both may thus be prepared for taking the fullest advantage of electricity." Chapters deal with the economics of electric supply, costs, lighting, water supply, power in the barn and farmyard, crop drying, milk production, poultry and egg production, miscellaneous application of electric power and electricity in the farmhouse and cottage.—P. Mackintosh.

RIKLI, M. Das Pflanzenkleid der Mittelmeerländer. [**The plant cover of the Mediterranean countries.**] 3 vols. 25 × 18. pp. 1418. [Pagination is continuous] 200 pls. incl. chromopls. Bern: Hans Huber. 1943, 1946, and 1948. Swiss francs: 122.50 [Eidg. Tech. Hochsch., Zürich] **697**

With the appearance in 1948 of Volume 3 is completed Professor Rikli's authoritative work on the Mediterranean countries, which gives a vivid picture of the plant cover in relation to the climate and the civilizations, old and new, of this favoured region.

Vol. 3 comprises pp. 1095 to 1418 of the total work, and the greater part of it (pp. 1114-1309) is ocupied by a list of the pertinent literature. The list comprises 3700 titles and is classified under A. climatology; B. soil science; C. general information; D. floras and floristic catalogues; E. regional plant geography (a very large section, subdivided geographically); F. adjacent regions and neighbouring countries; G. lands under cultivation; H. agriculture; J. woods and forests. In addition there are a list of the author's extensive travels in the Mediterranean region over a period covering 1889 to 1936, lists of the plates, figures in the text and maps of plant distribution, and indexes of (a) authors, (b) countries and civilizations, and (c) a very full genera and subject index combined.

Vols. 1 and 2 have been reviewed in *Herbage Abstracts* 13. Abs. 1450 14, Abs. 682; and 17. Abs. 1477.—G. M. Roseveare.

REPORTS

SWEDEN. Annual report on the work of the Swedish Seed Association in 1947. *Sveriges Utsädesförenings Tidskr.* **58.** 139-86. 1948. **698**

Work at Svalöf included the following :

Autumn wheat. The particularly inclement winter with little snow, the occurrence of *Fusarium*, a serious attack by *Hylemia coarctata* larvae, and drought during May subjected the already weak stand to a very severe test. Varieties belonging to the West European type of hardiness, represented by Mendel II and Trifolium 14, were completely winter-killed. The South Swedish assortment was much thinned out. Only one variety, 01354, from Äring I × Stål, survived to the extent of more than 50 per cent, and was too the only South Swedish variety which gave a yield of more than 2000 kg. grain per ha.

Skandia III and in particular the new Skandia selection, 01092, substantiated anew its superior hardiness in comparison with Skandia II. Eroica exhibited slightly better winterhardiness than the Skandia type.

In the Middle Swedish assortment there were in the large comparative trials several numbered varieties, selected from populations which had survived the very severe climatic conditions of the war winters. These included besides the Ultuna variety 01392 (Odin), from Ergo × Gluten, together with the Östgöta line 01440, from Bore I × Sammet, a number of crosses based on the exceedingly valuable land wheat lines Sv 28/1056 and Sv 36/175 of Halland and Västergötland origin respectively. Outstanding among these new varieties are 01420 (from Skandia × Sv 36/175), 01335 (from Skandia × Sv 28/1056) and 01480 (from Äring × Sv. 36/175). Virtus showed the best winterhardiness, but gave a lower yield than a number of the new bred lines. U 01392 b, from Ergo × Gluten, gave the highest yield, 3335 kg. per ha.

Autumn wheat ripened very late. The grain was shrivelled and uneven but had an unusually high crude protein content.

Spring wheat. Weather conditions were favourable for this crop and no diseases were noted. Ripening began in the middle of August and proceeded very rapidly. Grain yield was from 3500 to 4000 kg. per ha. Two numbered varieties, Ög 01140 and Sv 01110, gave the best results for the year. Of varieties placed on the market Kärn II and Blanka were highest in yield. The crop was of particularly good quality. Hectolitre weight varied between 81 and 84 kg : thousand-grain weight was on the average c. 35 grm. The crude protein content was very high.

Autumn rye. Sowing of the comparative trials was begun at Ugerup on 18th September and at Svalöf on 1st October and concluded on 10th October. Panicle emergence occurred at Svalöf on 31st May and at Ugerup on 7th June. Development and yield were at Svalöf medium-good, at Ugerup very good particularly considering the severe drought. At Svalöf there was very little lodging, but it was noted in several varieties at Ugerup.

Oats. Sowing of the trials was begun on 29th April. Grain yield in white oats was about normal. The highest grain yield was given by Trio, 01456 (from 01273 × Guldregn II), 01470 (from 01506 × Guldregn II) and Sv 44/351 (from 01450 × Flämingsgold). Quality of grain was good ; the forced ripening caused by the heat resulted in a relatively high percentage of shedding.

Among the early white oat varieties the Finnish Eho oat together with K 35/66 from the cross Gopher × 01273 gave the highest grain yield.

In the Middle Swedish black oat assortment the warm summer appears to have favoured the later types most. The highest grain yield was given by U 42/86 (from Stormogul II × Extra-Klock), Sv. 38/2053c (from Stormogul II × Argus) together with Stormogul II and I. The yield was on a level with that of white oats.

The extremely early black oat varieties Orion II, Å 01390 (from Orion II × Sirius) and Orion III gave the highest grain yield in comparison within this type.

Barley. Sowing of two-rowed barley was begun on 30th April. In spite of the drought good yields were obtained. Ymer gave 5000 kg. per ha. compared with Maja's 4790 and Freja's 4690 kg. per ha. Best of the Ymer lines was 01518. Good yields were also attained by Sv 01508 (Maja × Freja), K01521 (Kenia × Isaria), Sv 02020 (Maja × Kenia), Sv 01515 b_3 (Maja × Sv 34/22) and Sv 02040 (Gothland land barley × Maja).

Trials with six-rowed barley were sown on 13th May. The variety Sv 01771 (Juli × Asplund) which was handed over for multiplication in the spring of 1947 gave 5070 kg. grain per ha. compared with Brio barley's 4510 kg. Naked barley—Sv 01793—had an extremely high protein content (16.0 per cent).

The autumn barley trials were sown on 27th September 1946. Bore barley showed defective hardiness but was, however, markedly superior to Fimbul barley.

Legumes. Sowing was begun on 25th April. The Hero pea, U 05181 (from Hyring pea), Sv 43/43 (Hero × Artturi) and Drott (Sv 01080) were the highest yielding of the fodder peas.

The best vetch varieties were U 02281 (from Bulgarian), Sv 43/64 (from Webb's vetch) Östgöta Småvicker and U 02261 (from Polish vetch). Field beans were well developed ; line U 39/19 was especially promising.—R.P.J.

SCHLIPPE, P. de. Sous-station d'essais de l'I.N.E.A. à Kurukwata (Extraits du premier rapport annuel) [Experimental sub-station of I.N.E.A. at Kurukwata (Extracts from the first annual report)] *Bull. agric. Congo belge* **39.** 361-402. 1948. **699**

The sub-station of Kurukwata (Uele, Faradje Territory) was founded in March 1946. The first year's programme consisted mostly of rice intervarietal trials, of which it is considered premature to publish results. This article reproduces the part of the report dealing with the agricultural methods of the local natives and with the trials carried out in order to study these methods from a dual point of view: (a) of the total effort displayed by the native to produce his food ration, and (b) of the distribution of this effort in the different parts of the work. The crops grown in this region are: groundnut, *Vigna sinensis*, maize, sorghum, rice, eleusine, sesame, *Cajanus indicus*, *Voandzea subterranea*, *Phaseolus vulgaris*. Results show that very high yields are obtained with non-selected varieties and primitive culture methods. The poverty of the native is explained by the very high cost at which foodstuffs are produced. It has been calculated for the principal crops that 28 per cent of the working effort is given to the cultivation itself (preparatory work to clear the soil included), 34 per cent to the harvest and treatment of the crops, and 38 per cent to the transformation of crops in foodstuffs. Price of foodstuffs is high because of primitive methods and implements used in harvesting, treatment, conservation and transformation of crops.—E.B.

UNIVERSITY OF MINNESOTA Department of Agriculture Annual Report of the Southeastern Minnesota Farm Management Service, 1947. pp. 28. St. Paul 1, Minnesota, April, 1948. **700**

UNIVERSITY OF MINNESOTA, Department of Agriculture. Annual Report of the Southwestern Minnesota Farm Management Service, 1947. pp. 29. St. Paul 1, Minnesota, May, 1948. **701**

ARGENTINE REPUBLIC. Agricultural Experiment Station of the Province of Tucumán (Estación Experimental Agrícola de la Provincia de Tucumán). Report for the year 1945. *Rev. industr. agric. Tucumán* **36.** 129-74. 1946. [Received 1948] **702**

The report on the Department of General Agriculture and Horticulture is presented by the Head of the Department, *E. F. Schultz.*

Weather. Rainfall in 1945 was above the average for the last 61 years but the distribution was abnormal. In March and April the high degree of humidity combined with deficient luminosity was the cause of much harm to the harvest of cereals such as maize and rice. Groundnuts and sunflowers also suffered. Some other cultures, for example, cowpeas, soybeans and other legumes intercropped with citrus fruits, were unable to complete their normal growth cycle because of the lack of rainfall in the spring.

Flax. Exploratory work in flax-growing was begun by the Station in 1942; trials, at first of small plots and later on a larger, co-operative scale in various parts of Tucumán, gave high yields and a fibre of good quality, and the culture has now become established in the Province with 400 hectares under cultivation in 1945, an area which it is hoped will soon be considerably increased. A modern processing factory newly set up at Concepción was in full action at the end of the year. The factory not only ensures the utilization of the crop, but distributes seed to the growers.

Of the 400 ha. sown in 1945, the harvest of 370 ha. was satisfactory, an average yield of 4000 kg. per ha. being obtained. In some cases, where sowings were early and took place in well-prepared lands previously occupied by rice, record yields of 7200 kg. per ha. and over were obtained. The plants reached an average height of 1.50 m. and in many cases as much as 1.70 m. A striking feature of the cultures has been their resistance to cold, for an untimely frost of —2.7°C. which occurred when the plants had already grown to a height of 35 to 40 cm. had no effect upon their normal growth.

A trial of sixteen flax varieties was carried out in 1945 in co-operation with the Pergamino Experiment Station. Sowing was done on June 12th with four replications. Growth was retarded by the drought in July until the cultures were irrigated on July 31st. Continuing drought in August and September and a lack of water for irrigation further retarded normal development and resulted in a poor yield of straw. Although the results of the trial (tabulated) were on the whole unsatisfactory, this was due entirely to the abnormal weather of 1945 which hindered the steady growth essential, especially during the first 70 days of the plants' life, for the production of good flax. When necessary, irrigation should be used to maintain this growth until a height of 45 cm. is reached, after which there is a risk of lodging if more water is applied. Some useful data were obtained from the trial. An experiment in sowing five varieties on June 13th and July 5th respectively, confirmed previous findings that relatively early sowing is preferable under the regional conditions, late sowings resulting in a 10 to 50 per cent reduction in yield and poorer quality fibre. The best time to sow is between May 1st and June 15th, and preferably before the end of May. In 1945, plants sown on May 14th reached a height of 88 to 94 cm. and gave a yield of 5833 kg. dry straw per hectare.

Maize. A trial of eight varieties was sown under carefully controlled conditions and germination and early development was good, but the abnormally dry conditions experienced during the later stages of growth and especially during the critical flowering period rendered the trial worthless. From the commercial varieties not a single cob was obtained.

Sunflowers. Of the two oil plants grown in the Province, namely, the groundnut and the sunflower, the latter is better adapted to the regional climate and diversity of soils. After the forage sorghums, it is more resistant to drought than any other Tucumán crop plant, and because of its relatively short growth period it is possible to make continuous sowings over a period lasting from the beginning of October to the middle or end of January. The existence of a processing factory is a factor encouraging sunflower growing in the Province.

In 1944 selection for white grain was begun among plants with fine-striped grains, and it was hoped that seed of this selection would be ready for distribution in 1946. The thousand-grain weight of the fine-striped variety is 77.2 grm., that of the white selection 97.7 grm.

Varieties introduced from Russia have hitherto failed to become acclimatized and the yields were low, principally because of the small heads. At present a more promising Russian variety is under trial. This variety came originally from Saratov, but the seed at present under observation was obtained from the Pergamino Experiment Station. It is interesting more particularly because of its low growth habit and the possibility of improving it. The thousand-grain weight is 88.5 grm.

Seed distribution. Seed distributed during the year included 30,378 kg. oats, 1540 kg. sunflowers, and 1438 kg. soybeans.—G.M.R.

NEWS ITEMS AND SCIENTIFIC NOTES

Great Britain

Hill Farming Act 1946. 703

A press notice, dated 18th Jan. 1949, from the Ministry of Agriculture and Fisheries, notes that under the Hill Farming Act financial assistance can be given to owners and occupiers of hill farms who are willing to carry out schemes for the improvement of their land. Grants amount to one-half of the cost of the work to be done under approved schemes, which must be sufficiently comprehensive to ensure the proper rehabilitation of the land for hill farming purposes. They may cover a wide range of improvements such as the repair and modernization of farm houses, cottages and farm buildings, the building of new cottages and farm buildings, the construction and improvement of roads and bridges, the provision of water and electricity supplies, the improvement of grazings, drainage, fencing, and the planting of shelter belts.

By the end of 1948 no less than 1951 proposals for improvement schemes had been put forward in England and Wales. Of these, 989 had been approved in principle, subject to the submission of documents for formal approval, 17 formally approved, 506 more still under consideration and 439 had proved unsuitable and had either been withdrawn or rejected.—P.M.

Hill Schemes Lag in Wales. 704

In the discussion following the Government's proposed Council for Wales, various Members of Parliament pointed out the difficulties with which Welsh farmers had to contend. Hill farmers were finding that the subsidy granted under the Hill Farming Act, in its net result, amounted to nothing. In operation of the Act, 335 schemes had been approved in principle, not practice, out of 1,009. Three seasons had been lost putting into force the provisions of the Act, Schemes such as encouragement of seed potato growing, guaranteed prices for wool under the 1947 Act schedule, electrification and modernisation of farm houses and buildings, etc., would all help to improve conditions for farmers—especially in Central Wales.

Mr. J. Griffiths replying for the Government, said industry and agriculture would be represented on the Council, which would aid the improvement of Welsh government administration ; it would meet quarterly and the Minister of Agriculture or his secretary would be present when agriculture was discussed.—*Fmr's Wkly*, Dec. 3rd, 1948.—K.O.

Essex Reservoir. 705

A proposal to build a reservoir in the South Hanningfield district to serve the Basildon, Southend, Hornchurch, Romford, Barking, and East and West Ham districts is causing concern to the farmers of the 1500 acres of fertile grass and arable land there. It is proposed to draw the water from the river Stour and build a large dam in the north-east corner of the reservoir. Most of the farmers concerned have been given to understand that their farms are likely to be taken over within the next year.—*Fmrs' Wkly*, Dec. 10th, 1948.—K.O.

£100,000 Welsh Farming Scheme. 706

An agricultural development scheme for North Wales, costing £100,000 in a grant from the Treasury, was intimated to the Anglesey County Council in October, 1948. A company the "Welsh Agricultural Industries, Ltd." is to be formed, working on a non-profit basis in North Wales. The scheme was submitted to the Development Commission as a large scale agricultural experiment on modern mechanized, lines embracing all aspects of agriculture and occupying 1000 acres.

The proposal is supported by M.P.'s and the N.F.U. provided it can be arranged without disturbance to existing agricultural interests.—*Fmr's Wkly*, Oct. 22nd, 1948. —K.O.

Seed Certification. 707

A letter to the Editor of *The Times*, published on 24.1.49, stresses the need for an organized national scheme for the certification and sealing of the better strains of herbage and other seed in Britain. It is claimed that the experience of New Zealand has proved that the provision of certified seed is the surest way of increasing the quality of grassland.

It is acknowledged that the greatest increase in agricultural production will be achieved through greater production of livestock products, in turn the result of grassland improvement. An official reason for the failure to operate State-sponsored certification schemes in Britain is that the available staff of the N.A.A.S. is too limited to allow concessions to only " one section of the agricultural industry." That seed certification concerns only a minority is, of course, an idea emanating from lack of knowledge of the facts.—M.H.

Grain Storage. 708

After 3 years the Colchester Grain Storage Association has proved a great success both to the farmers and merchants. The Association is entirely non-profit-making and each member must invest in the enterprise a minimum of one share £200—a maximum of 5 shares being allowed. Each share entitles the farmer to the use of the drying facilities and one of the 100 storage bins (each bin holding 200 sacks). Costs for storage and drying are given. When not required the farmer can let the bin through the Association.

The drier is situated with easy access to road, rail, and water transport facilities. A Ransome oil-fired drier is used. Once dried, grain is moved every 3 weeks varying with the moisture content. Movement of grain from bin to bin, etc., is effected by endless belt conveyors and elevators. When drying is completed 2 men are the only staff required to carry out the continuous moving of grain to keep moisture contents low.—*Fmr's Wkly*, Sept. 24th, 1948.—K.O.

Grain Drying and Storage. 709

On Jan. 17, 1949, a joint deputation from the N.F.U. and the National Association of Corn and Agricultural Merchants, was received at the Ministry of Agriculture and Fisheries. The Deputation represented to the Ministry the urgent need for up-to-date advice to be available to farmers on the problems of grain conditioning and storage arising out of the increasing use of combine harvesters and to request that the fullest possible assistance should be given by the N.A.A.S.

It was reported that good progress had been made at the N.I.A.E. in studying the design and operation of ventilated bin equipment. A satisfactory standard design had been evolved, suitable for construction in concrete, full particulars of which were available from the Institute. —P.M.

Sweden

Swedish Seed Association 710

The annual meeting was held at Svalöf on 21st July. The chairman gave a brief survey of the work of the Association during the past year, and referred to the development and further consolidation of the activities of the branch stations.

The Association's breeding work during recent years had resulted in a number of new, valuable varieties, among which should be mentioned the autumn wheat varieties Odin and Robur, spring wheat 0.1050 (Svalöf Ella spring wheat), the two-rowed barley Heindal (02000), the six-rowed barleys Åsa and Edda II, the oat varieties 01550, 01560 and 01380, the fibre flax varieties Gerda, Margareta and Kristina, and the oil flax variety Valuta, the autumn rape variety 02, an early strain of red clover (026), and the fodder sugar beet Solid.

Dr. I. Granhall gave an address on the Association's barley breeding work, and Professor Akerman gave a report on the trials of the greatest current interests on the experimental grounds in 1948.—R.P.J.

Netherlands

Agricultural Documentation. 711

An account of the development of agricultural documentation in the Netherlands is given by D. J. Maltha, Head of the Documentation Department of the Ministry of Agriculture, in the *Maandblad* of the Ministry's Information Department for December, 1948. Progress has been made chiefly since the end of the war. Card indexes of current literature are compiled in the libraries of the Ministry itself and of the Agricultural College at Wageningen, and a process of photocopying has been adopted which will make it possible, from January, 1949, onwards, for all interested institutions and persons to obtain information on given subjects by means of these photographed cards, application being made to the appropriate department of the Ministry. An organization of specialist libraries has brought all the agricultural libraries in touch with one another, and there is every promise of helpful co-operation in the future. A committee is studying, among other things, the compilation of a central catalogue of agricultural periodicals and the agricultural section of the Universal Decimal Classification.—G.M.R.

France

Seed Production 712

This aspect of agriculture is little known in France because of its limitation to certain regions. There are two principal areas for the production of seed which requires special care and attention (such as transplanting) or which provides difficulty in harvesting. One of these areas is in Anjou in the valley of the Authion parallel to the Loire and known as La Vallée ; the other is near Avignon at Thor and St. Rémy. In other regions, Beauc, Aisne and Nord, there are extensive seed production areas for seed which is easy to produce : beans, peas, fodder and sugar beet. Owing to restriction on imports and of poor yields during the war there is a need for other centres which are now being created. About 40,000 ha. of land is devoted to seed production in France.

Before the war, by virtue of a verbal contract between seed producer and seed merchant, the producer took the responsibility of growing the seed crop of a variety selected and provided by the seed merchant (taking precautions to avoid hybridization) and the seed merchant guaranteed to buy the whole crop at the current price for that year.

The contract is now a written one and in duplicate, one copy being kept by a professional body. The crop is controlled by seed inspectors who report to the seed merchants and advises on the management of the crop. Seed is tested in the laboratory and in the field before being sold.

Before the war there was a market for French seed all over the world, particularly in the Americas and Central Europe. Some of these markets have been lost. *Potasse*, Sept. 1948.—D.B.

The Aeroplane in Agriculture. 713

European countries lag far behind America which has 4500 aeroplanes and helicopters in use for agricultural purposes. In France a co-operative known as the Helicoop was formed early in 1947 but so far the only helicopter ordered cannot be imported owing to lack of dollar credit. One aeroplane is being used by the farmers of Santerre. A demonstration of its use in destroying pests was given 24th May, 1948. It is hoped to organize a society for financing the purchase of one or more planes and other equipment and have them in operation by the spring of 1949. *Potasse*, Sept., 1948.—D.B.

Colonial Development 714

An abstract is given of the First Report of the Commission for the modernisation of over-seas territories presenting a plan for the development of agricultural production.

According to schedule, rice production for internal consumption in Equatorial Africa will reach 145,000 tons at the end of the 10 years' plan. By a further increase 165,000 tons will be reached. In Madagascar, where rice is the basic food, the rice cultivated area will be extended from 507,000 to 800,000 ha. with a production of 1,250,000 tons ; with these figures exportation will be commenced.

Groundnut production (in shells) will reach 1,135,000 tons against 600,000 tons of pre-war time, 950,000 tons of which will be exported as peeled nuts or oil.

Development will be given to dry cotton cultivation in French Equatorial Africa, particularly in the Cameroons and French West Africa and production will increase from 15,700 tons to 55,000 tons of fibre ; one half of this amount should be obtained with mechanized cultivation following the rotation : groundnut/cotton/green manure. A further increase of 10,000 tons are in project after the 10 years' period.—*Agron. trop.* Vol. 3. pp. 500-6., 1948.—E.B.

Italy

Plant Introduction 715

News of the Division of Plant Exploration and Introduction of the U.S. Department of Agriculture is given by L. Fenaroli, Director of the Bergamo Experimental Station for maize cultivation. It is suggested that a similar service should be organized in Italy. A list of plants introduced by the Bergamo station during 1947 is given. —Suppl. to *Ann. Sper. agrar.* Vol. 2. No. 5. Roma, 1948.—E.B.

Wheat for Seed. 716

By order of the Ministry of Agriculture, control on seed production of the varieties listed in the "National register of selected wheat varieties," by multiplication of seed obtained from the institute or person who has bred the variety, is to be carried out by the National Institute of Genetics for cereal cultivation. The stamp affixed on the product by the Institute of Genetics will certify the variety and the origin of the seed but not germination percentage. This is to be guaranteed by the firm that has done the selection. *G. Agric.* July, 1948.—E.B.

Agricultural Economics 717

The "Istituto Nazionale di Economia agraria" has issued a publication in English, giving general information on agricultural economics in Italy. A chapter deals with the Institutes and Research centres of agrarian economy in Italy. The "Istituto Nazionale di Economia agraria" in particular, is an independent body attached to the Ministry of Agriculture and Forestry, and has the object of carrying out research and study. Among the several Agricultural Academies and Societies, the "Academia dei Georgofili" of Florence is the oldest, having been founded in 1753.—Rome, 1948.—E.B.

Flax. 718

Although some retting and heckling plants in Lombardy and Veneto have re-started work after the interruption caused by war, there is a crisis in the flax industry because of the higher price of the national product in comparison with the product imported from France and Holland. The need of a solution is stressed. In some regions flax is the usual spring crop and cannot be easily replaced, and its working employs labour during winter when unemployment is higher. *G. Agric. Domen.* Jan. 1949.—E.B.

Roumania

Groundnut Seeds 719

The Bureau has received an enquiry from a correspondent in Roumania asking for samples of a few pound each of groundnuts (*Arachis hypogea*) for trial in that country. Varieties with a short vegetative period and bunch types are required. Exchange is not available for payment, but co-operation is earnestly desired by our correspondent.

Any correspondents in a position to meet this request are asked to send their samples to this Bureau, which will arrange for their transport to Roumania. Parcels should contain a certificate of an inspector as to pests and diseases, and also a statement as to origin.

Most of the improved varieties of soybeans in Roumania were lost during the last war, and seed samples of these would also be much appreciated.

Seeds of a dwarf single-flowering sunflower variety are offered in exchange.

Morocco

Agronomic Research Service. 720

The Service for Agronomic Research and Agricultural Experimentation in Morocco started on 1st October, 1946, and works in co-ordination with the Centre for Agronomic Researches of Rabat, under the direction of G. Grillot. Under the auspices of this body, the publication of a series of bulletins, " Les cahiers de la Recherche Agronomique" has started. The bulletins are to appear at no set dates of publication. The first issue, 1st April, 1948, gives information on organization and programme of the Centre and Service of Agronomic research and of the experimental farms and stations. A report on the activity of the Centre of Rabat from 1941 to 1946 and of the Service of Agronomic Research during 1947 is also given.—E.B.

Nigeria

Rice Production. 721

A scheme to put 5,000,000 acres under rice in Nigeria and to construct irrigation works costing £7,000,000 is reported to have been recommended by a Commission sent to West Africa by the Colonial Office early in 1948. After extensive air and ground surveys, areas around Maiduguri (Bornu) and Bakogi (Agaie) were selected. Here, prospects are calculated to justify the construction of major irrigation works and £7,000,000 is contemplated for such works in the Maiduguri area alone, to bring 2,000,000 acres under rice cultivation. Other areas being considered are along the south bank of the Benue river and the Hadejia river. *The Crown Colonist*, Jan, 1949.—P.M.

Northern Rhodesia

Maize instead of Groundnuts. 722

The 1949 Budget estimates provide a sum of £300,000 for a proposed maize production scheme. This, it is understood has taken the place of the groundnuts scheme of the Overseas Food Corporation in Northern Rhodesia. No details are known but it is believed to be a Government scheme similar to the Kongwa (Tanganyika Groundnuts) Scheme. Earlier reports said that the O.F.C. was unwilling to undertake the cultivation of groundnuts in Northern Rhodesia unless the Northern Rhodesia Government subscribed a share of the capital. It was stated that if the enterprise was proceeded with, it would be on a much smaller scale than that originally proposed. Farmers are dubious about the maize scheme. There are already shortages of African labour, of petrol and machinery and it is felt that a better plan would be to get European farmers to increase their acreages rather than to launch a new plan. *The Crown Colonist*. Jan. 1949.—P.M.

Groundnut Scheme. 723

Although experimental cultivation of groundnuts will begin shortly on an area in the Mumbwa district, no large scale development is proposed. " There is no wider objective than to provide technical information of value to the corporation and Northern Rhodesia," states Dr. A. M. Bunting, chief scientific adviser in Africa for the Overseas Food Corporation.

Rotation of crops such as maize and sunflowers against groundnuts would be studied and an attempt made to confirm the results obtained at Mumbwa last year of an improved return following the use of lime and phosphatic fertilizer. A falling off in yield of the second of two successive crops sown in the same areas would be examined. *Fmr's Wkly, Bloemfontein*, Dec. 29th, 1948. —K.O.

Mozambique

Cotton. 724

Through the activities of the special cotton services, cotton growing is now restricted to those lands specially suitable for it. Production methods have been improved through insistence on sowing at the time experience has shown to be best, and through the uprooting and burning of the plants after harvest in order to lessen the propagation of diseases and pests. As a result, both the quantity and quality of the cotton produced have improved. The average yield of raw cotton per hectare was 106.59 kg. in 1940 and 299.9 kg. in 1947.

	1940	1947
Area cultivated	191,660 ha.	248,482 ha.
Yield of raw cotton, in tons	20,430	74,544
Number of growers	534,332	601,153

Portugal, July, 1948.—G.M.R.

South Africa

Crop Rotation the Answer to Soil Erosion 725

Discussing soil erosion in an interview with a *Farmer's Weekly* representative in Pretoria, Professor J. M. Tinley, Professor of Agriculture and Economies, College of Agriculture, University of California, said the problem was not confined to South Africa but to many new countries. To appreciate the need for soil conservation, it is necessary to consider nature's way of returning to the soil what she has taken out, by means of returning bird and animal droppings and vegetable matter.

Overstocking of land with sheep—due to high wool prices, resulted in the denudation of grazing lands. Many farmers little realized that sheep, with shorter strides, did far more damage to grazing land than cattle.

Explaining his views that crop rotation and soil fertilization are the answers to erosion, Professor Tinley pointed out the following anti-erosion methods :—1. Contour ploughing and the building of silt dams. 2. Use of heavy machinery in making artificial contours, where serious erosion has already taken place. 3. Growing of different grasses to stop washing away of top soil.

Concluding, Professor Tinley said the development of transporation, refrigeration, electrification of rural areas, and the use of modern machinery and technique as in sugar beet production, meant that fewer people were needed on the land, and he did not think the drift of the rural population to the towns as serious as people considered. *Fmr's Wkly, Bloemfontein*, Nov. 3rd, 1948.—K.O.

Graff-Reinet Conservation Plan. 726

This plan for the Doornberg-Zuurplaats Soil Conservation District came into operation on Jan. 1st, 1949. Details of the plan regarding vermin, pests, veld burning and cropping are given.

When a scheme for an individual farm is drawn up, the entire crop production system will be reviewed and planned and a programme for protection of lands against soil erosion and improvement of soil fertility by application of a suitable crop production system instituted. Attention must be given to soil preservation, veld and water sources, construction of dams, sheds, silos, tree planting and the restoration of eroded regions. *Fmrs Wkly, Bloemfontein*, Dec. 22nd, 1948.—K.O.

Tsetse Eradication. 727

The complete eradication of tsetse-fly from the 7000 sq. miles of fly-belt in South Africa has been made possible by the use of helicopters manned by crews of the South African Air Force. D.D.T. is sprayed from 250 gallon tanks fitted to the plane and it is estimated that one helicopter could spray 200-400 acres an hour in areas that cannot be reached by the fixed-wing aircraft. Apart from their use against the tsetse-fly, helicopters are likely to be used for spraying against other insect pests and malaria. *Fmr's Wkly, Bloemfontein*, Jan. 5th, 1949.—K.O.

Palestine (Israel)

Water "Divining." 728

A new botanical theory is described which will help prevent erosion and aid irrigation in desert areas of the world.

Dr. Boyko's (Palestine Government, Department of Forests) "Geo-Ecological Law of Distribution" overcomes the handicap of irrigation practices which interfere with the subterranean water level causing permanent changes in surface vegetation leading to soil erosion and barren land, by simple investigation dependent on climatic and other factors which influence the geographical distribution of plants.

In the Mediterranean area Dr. Boyko studied the growth of the root plate at the foot of trees to learn the speed and state of erosion during their lifetime. A 250-year-old olive tree indicated that 70 cm. of surface soil had been eroded from the local area, although the ground had only a gentle slope of 10 degrees, while trees on level land indicated that surface soil had accumulated. In the Haifa and Tel Aviv districts heavy demands on irrigating artesian wells have lowered the water level below sea level.

Much of the desert land of the world has a natural flora of great interest because of underground water level. The author listed 60 different species in a botanical survey of the arid Wadi el Araba desert between the Dead and Red seas. *The Crown Colonist*, Dec, 1948.—K.O.

Australia

Agriculture Conference in Australia, 1949. 729

The 1946 British Commonwealth Scientific Official Conference resolved that a Specialist Conference be held with the major objective of exploring problems connected with the integration of the three main branches of agricultural science—soils, plants and animals—to be the first of a series of Specialist Agricultural Conferences. Arrangements have been made to hold the Conference in Australia, commencing the sessions in Adelaide from 22nd to 31st August, 1949. After a twelve-day tour through south-eastern Australia, the final sessions will be held in Canberra on 13th, 14th and 15th September. The theme of the Conference will be *Plant and Animal Nutrition in relation to Soil and Climatic Factors*. The primary object will be to focus attention on the principal gaps in our knowledge of the subjects and on the main problems requiring attention.

Membership of the Conference will be limited to research workers active in the fields under discussion, the official members comprising about fifty delegates. from the various countries of the British Commonwealth. Papers, however, will be accepted from non-delegates and a limited number of observers will be admitted. Such papers should be under one of the three headings—"Effects of Specific Soil and Climatic Factors on the Nutrition of Plants"; "Nutritional Problems of the Animal as determined by Plant and Soil"; "Influence of Plant and Animal on Soil Fertility." They should not review present knowledge other than incidentally, in view of the fact that the first session of the Conference will be devoted to papers from official delegates, only, upon a "Review of Present Knowledge of the Climatic and Soil Factors affecting Nutrition of Plants and Animals."

The organization of the Conference is in the hands of the C.S.I.R. and the expenses of delegates during the inter-session tour only will be borne by the Australian Government. Further information may be obtained from the Secretary of the Conference Committee, Specialist Agricultural Conference, c/o. C.S.I.R., 314 Albert St., East Melbourne, C.2., Victoria. Papers submitted for the Conference Sessions should reach the Secretary by the end of January, 1949.—K.O.

Weeds as Crops 730

There is a possibility that saffron thistle (*Carthamus lanatus*) which is on the Australian list of prohibited noxious weeds, will be cultivated as a crop. The seed has good oil properties and is valuable as turkey feed. In 1948 when harvesting experiments were carried out, it was found that the crop could be reaped with a normal harvester provided that every alternate tooth was removed from the comb. Seed is larger than wheat grain and must be harvested before absolutely ripe or the oil content deteriorates.

Samples of common sida (*Sida rhombifolia*) are being sent to England to discover whether the plant can be used in place of Indian jute for hessian and sacking. The extraction of oil from seeds of the wild turnip (*Brassica tournefortii*) promise a use for this weed. The oil has the same purity, as mustard seed oil, tastes sweeter, has clearer colour and will not go rancid. It can be used for culinary purposes and as a base for perfume and cosmetics, while the residue makes good laying mashes for poultry farmers. *Australian Rural Reference Newsletter*, Jan. 24, 1949.—P.M.

Canada

Research and the Farmer. 731

The opinion that research is not satisfactorily utilized, is expressed by farmers and others throughout Canada. Agricultural knowledge remains ahead of farm practice because the existing education facilities by publications and films are often unintelligible to the farmer. The author shows how increased yields from crops obtained by better cultivations, conservation of the soil and control of diseases and pests, would result if more research knowledge were available to the agricultural community.

Accounts of education and extension methods in Great Britain and the U.S.A. are given and these recommendations are made :—(1) " That a national Committee on Extension be established under the National Advisory Committee on Agricultural Services. Associated with this regional committees consisting of Dominion, Provincial, and University workers with farm workers and the agricultural press, would provide opportunities to study extension problems. (2) That the Federal Government expand its extension services so that appropriate research results may be available in suitable forms for timely distribution. (3) That an evaluation of extension methods be conducted by the Federal Government in co-operation with the provinces in representative regions and consideration given to language background and education of the people. (4) That extension specialists be provided. (5) That the Federal Government provide financial assistance to provinces, and Universities as an aid in co-operatively developing adequate extension programmes."

The author believes that the Agricultural programme would be strengthened if the Dominion Department of Agriculture concentrated on securing information and making it available to farmers and industry and in assisting provincial extension departments—leaving the actual conducting of community programmes to the province. *Agric. Inst. Rev.* 3. Nov. 1948.—K.O.

U.S.A.

Atomic Energy and Agriculture. 732

The " tracer-technique" under which chemicals radio-activated in the atomic fission pile are used, is helping scientists to follow the minute chemical processes of plant life with an accuracy unattainable in pre-atomic days. Radio-activated chemicals (radio-isotopes) are mixed to food that plants consume. They serve as a "tag" attached to a food element for identification of that element as it passes from the soil through the roots into the plant body and the fruit. The elements so marked can be traced by radiography or radiation-sensitive instruments.

Such information is helping United States agriculturists to understand better how to use fertilizers. They are learning exactly when plants need fertilizer: they learn what fertilizer to apply. Phosphorus for example is used by maize, tobacco and cotton mainly in the early stages of growth. Therefore, feeding phosphorus while the plant is maturing would be wasteful. Radio-active tracers are also being used to study the effect on plants of sulphur when it is used as an insecticide or fungicide.

Eighteen laboratories are concentrating their studies on photosynthesis. Working with radio-isotopes, scientists have discovered that at one step in photosynthesis, a still unidentified substance may combine with carbon with the aid of a stored rather than direct sunlight. In these instances the sunlight is stored for later use by chlorophyll.

The point at which the plant divides its chemical output has been discovered. From this point, one path leads to sugar, another to starch and another to fat. In this discovery lies the hope for controlled and greatly increased food production. If man knew exactly how plants transform the CO_2 of the air and other chemicals, he might learn to duplicate photosynthesis in chemical laboratories. By blocking one or the other of the three chemical production lines, plants might thus be induced to produce protein instead of sugar or fat, or fat instead of sugar and protein.—*U.S. Information Service.*—P.M.

South and Central America

Cereal Storage 733

Maize, beans and rice are the principal foods of the peoples of Mexico, Central America, the Caribbean Islands, Colombia and Venezuela. " There is a tremednous discrepancy between the prices paid to the producer and the prices paid by the consumer, both being the victims of the circumstances created by the weevil, the rat, mould and speculation." The speculator buys up crops, stores them under vaccuum-protected conditions and subsequently sells at high prices. The immediate result is that production is far below its potential level, for the producer has no incentive. International co-operation, with the aid of F.A.O., is necessary for the solution of the problem, and among the measures suggested by the author is the use of the Palmira Agricultural Experiment Station as a permanent centre of research and education in the storage, conservation and transport of grain. The Station is located in the Department of Valle, western Colombia, and is especially suitable for the following, among other reasons. It is accessible, being equidistant from the other countries concerned and having access to the seaport of Buenaventura, the airport of Cali and good land transport. The port offers facilities for studying the shipping of grain. The regional agricultural problems are similar to those of other parts of Latin America. The Station has already conducted fruitful research on the subject of grain conservation. Its geographical situation between the latitudes 0° and 5°N. makes the results of its experiments applicable to similar regions in other continents, for example, Ethiopia, Java, Sumatra, etc. The climatic conditions enable crop cultivation to proceed throughout the year. A great diversity of cultures exists within a short radius, from wheat and potatoes to rice and tropical crops. The Government of Colombia is fully prepared to collaborate in the scheme and the Rockefeller Foundation is interested in the development of the Palmira Station.—G.M.R.

Scientific Bibliography. **734**

The Conference of Latin American Scientists has passed several resolutions recommending UNESCO to take steps to promote scientific research in Latin America. The measures suggested include the organization of a scientific bibliographical service, and the publication of a catalogue of the scientific stocks of South American libraries. Governments should be urged to allow the free transit of bibliographical material. *Ciencia Invest.* Nov. 1948.—G.M.R.

Agricultural Information. **735**

E. A. Patiño of Mexico, in one of the *Cuadernos verdes* series of publications issued in Venezuela (Int. Ser. No. 12, 1947), has outlined the present sources of agricultural information available to the Latin-American countries, namely, the International Agricultural Institute, Rome, the Pan-American Institute, the Inter-American Statistical Institute and others. These services, however, are inadequate to meet the needs of American farmers, agricultural scientists and Governments, and a new inter-American organization should be created, to be supported by the several American Governments, for the collection and dissemination of agricultural information.—G.M.R.

Second South American Botanical Congress. **736**

A short account of the Conference is given in *Ciencia Invest.* Nov. 1948. The next Congress is to take place at Bogotá, Colombia, in 1952. Among resolutions passed are pleas to the Governments of the Latin American countries to establish natural reserves for the preservation of the indigenous flora and fauna and to create an institute at Cuzco, Peru, to study the pre-Columbian agriculture of the Andes.—G.M.R.

Argentina

Institute of Plant Industry. **737**

A pamphlet published by the Ministry of Agriculture in July, 1948, lists the personnel of the Institute and their activities. The Institute comprises three Divisions in charge respectively of plant immunology, plant genetics, and exploration and plant introduction. Each Division is subdivided into sections dealing with various aspects of the work. Breeding work is concerned with the following, among other plants: maize, wheat, sorghum, *Hordeum* sp., sugar beet, and a collection of oat material is being made. Collections in charge of the Plant Introduction Division include oil and fibre plants.—G.M.R.

New Publication. **738**

Experimenta is the title of a periodical to be published by the newly constituted Department of Regional Consultation and Experimentation of the University of Cuyo, situated at Mendoza, Argentine Republic. The first part appeared in December, 1948.—G.M.R.

Cotton. **739**

In view of the shortage of labour and the high cost of hand picking, which amounts to 35 per cent of the cost of producing every crop of cotton, eight mechanical pickers of the carder type were imported into Argentina in June, 1948, for testing in the next harvest, together with two pickers of the stripper type. Calcium cyanamide was to be used for the defoliation of the cotton plants, a practice which increases the efficiency of the picker. *Inf. No.* 352 *Sec. Industr. Com. Argentine Republic.* July, 1948.—G.M.R.

Brazil

Wheat. **740**

Every effort is being made to encourage the growing of wheat in Brazil. The Ministry of Agriculture's Information Service periodical (*Riquezas de nossa Terra*) for June, 1947, gives an account of some good results achieved in the State of Minas Gerais, and of a special visit by representatives of the Federal Government to inaugurate the harvest. The distribution in the State of wheat for sowing was to exceed 70 tons in 1948, compared with hardly 20 tons in 1947.—G.M.R.

Ecuador

New Publication. **741**

There is announced the publication of an Ecuadorean Bibliography of Science (*Bibliografía Cienitfica Ecuatoriana*) compiled by C. M. Larrea, comprising over 6000 titles. Only work concerned with Ecuador itself is included, not work of general or foreign interest which may have been done by Ecuadoreans. The bibliography is appearing as a supplement to the *Boletín de Informaciones Científicas Nacionales* published by the Casa de la Cultura Ecuatoriana, Apartado 67, Quito, Ecuador.—*Cienc. Invest.* Nov. 1948.—G.M.R.

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LAND UTILIZATION AND MANAGEMENT

WEATHERHEAD, T. D. **Air surveys to expedite Colonial development.** *Crown Colon.* **19.** 82-5. 1949. **742**

Examples given in this article indicate the vast scope of the development and the vital part air survey can play in the rapid development of the Colonies. The main purpose of Government mapping and photographic organisations is to provide the small-scale map which must be the basis of all Colonial development. A description of the work done by the Hunting Aerosurveys group and illustrations of different scale maps and ordinary and oblique air photographs are given.

Some examples of the use of air photography include the development of tin-mining areas, where an air photograph, even in densely forested areas, can provide valuable geological data which may be impossible to obtain on the ground. By being able to study the topography in three dimensions it is possible to determine the angle of dip of strata, and from the changing elevations of the forest canopy, to locate unconformities in the underlying structure. The application of these methods to determine the correct use of new agricultural land is illustrated in the air survey now being extended by the Aircraft Operating Company of Africa in connexion with the Groundnuts Scheme. Before these areas could be developed, a knowledge of the different soil and vegetation types, drainage systems, natural obstacles to road communications, and the distribution of native habitations was essential. Air survey is of importance in the replanning of native towns and should be useful in the development of British Guiana and Honduras. —K.O.

RUSSELL, Sir E. J. **Guard against soil erosion.** *Fmr and Stk-Breed.* **63.** 519. 1949. **743**

After describing the causes and results of soil erosion, the author describes the possible areas of soil erosion in Great Britain. Newly reclaimed fen soils are especially subject to wind erosion, especially in dry weather. Remedies are, to keep the land covered with vegetation and to plant shelter belts of trees at right angles to the prevailing winds. Though a solution is to cover the whole area with trees, it is now possible to fix these blowing soils by a system of alternate husbandry. Lucerne and cocksfoot in a seeds mixture are first grown to bind the particles, followed by deep rooting arable crops such as sugar beet and carrots or barley and rye. There is a danger of the soil blowing directly the ley is ploughed up and when a fine seed-bed is prepared for the small seed.

The old method of alternating corn crops with sheep-fed crops (the treading of the sheep consolidating the ground against erosion) guarded against blowing on light chalk soils. In the modern management of such soils care should be taken to include a good grass ley in the rotation.

Though water erosion has never been serious in Britain it does occur on arable fields on steep slopes. Nature has guarded against this happening to any great extent by covering temporarily bare land, with a profuse growth of weeds, which keep the soil particles together. In conclusion the author mentions the soil conservation programmes of America, the British Empire and the U.S.S.R.—K.O.

VEEN, J. van. **Dredge, drain, reclaim. The art of a nation.** Preface by *J. A. Ringers.* 26 × 19. pp. 166. The Hague: Martinus Nijhoff. 1948. 27s. 6d. **744**

Dr. van Veen is Chief Engineer to the Netherlands Water Control Service. It is to the fact that during the years of enemy occupation he was prevented from pursuing his normal work that we owe this authoritative, historical account, in English, of land reclamation and protection in the Netherlands. To those familiar with the smiling, prosperous aspect of the modern Dutch countryside, the story of the century-long battle with the elements for the attainment of this prosperity is almost incredible. The struggle began about 400 B.C. with the Frisians clinging to their man-made heaps of mud among the floods, and its most recent feat was the repair of the apparently hopeless Walcheren breaches at the end of 1945. While Dr. van Veen's book naturally stresses the social and engineering aspects of the story, the efforts of the common man, his tenacity, the tradition and the scientific research which have combined to make the Dutchman master of his watery situation, it contains also many points of interest to the agriculturist. The following examples may be noted. Use of the low-lying swamps of central Holland: " the quaking soils never could be made fit for bearing crops, but the surface of them could be made to bear cows. The water level of those quaking soils is higher than in the lower polders " (p. 39). The use of marine grasses in land reclamation, pp. 32-3 (*Spartina*) and p. 41. The poisoning of crops by sea water seeping beneath dikes and dunes and through locks into polders, pp. 107 and 129. Need for more arable land, p. 107. Development of agriculture in the new Zuyder Zee lands, pp. 117-8. The work is illustrated by many photographs and coloured maps.—G. M. Roseveare.

SANTINI, C. La bonifica nel Mezzogiorno. [**Land reclamation in South Italy.**] *Ital. agric.* **85.** 170-8. 1948. **745**

A review of land reclamation works in South Italy from early times up to the present day. Until the first world war, land reclamation had an hygienic-hydraulic object (control of malaria); its object has since become mainly an economic-agricultural one. Irrigation and regulation of the mountainous basins are the principal problems of the region. Account of present programmes of work and relative suggestions are presented.—E.B.

GILLMAN, S. **Common-sense methods to save soil.** *Fmrs' Wkly, Bloemfontein* **76.** 46-9. 1949. **746**

The article describes how the work of the United States Soil Conservation Service has aided in combatting soil erosion in the United States, and indicates some of the soil conservation practices which can be applied in South Africa.—K.O.

MISRA, R. K. **Damodar Catchment. Preliminary survey to study water losses by transpiration and evaporation.** *Cent. Bd Irrig. J.* **5.** 273-87. 1948. **747**

The total loss of moisture on account of transpiration and evaporation from the Damodar catchment is perhaps of the order of say about 22 inches per year or 40 per cent. of the annual precipitation. As has been already emphasized, this figure should be taken as a rough guess. Only a thorough investigation of the many problems involved can yield more reliable estimates. Besides these scientific investigations, an aerial survey of the whole catchment area is also essential if some idea is to be obtained of the actual distribution of different plant communities in the Damodar Catchment.—Author's summary.

EAST, L. R. **Water conservation and irrigation.** [contained in] Australia, its resources and development. Edited by *G. L. Wood.* 1947. 166-76. **748**

"This article does not cover all aspects of water conservation in Australia, nor does it deal with town supplies or inland navigation but it does attempt to show the important part the water supply engineer plays and has yet to play in the conquest of the climatic vagaries of the continent."

Apart from comparatively short coastal streams, the only permanent rivers are the Murray and its tributaries extending 414,000 square miles from Victoria, New South Wales, into Queensland. The report describes the Murray-Darlington river system, the Wimmera-Mallee open-channel system, and the irrigation works and policy which have been practised in Australia since the essentiality of storage of water supplies was realized. A detailed account of water conservation in New South Wales is given and maps illustrate irrigation areas in South-east Australia and artesian basins over the whole of the country. See also Abst. 1007.—K.O.

UNITED STATES Department of Agriculture. Agricultural Research Administration R.A.S. 109(P). **Soil classification helps fit crops and farming methods to individual farms.** 1948. pp. 2. [Mimeographed] **749**

The system of soil classification developed through years of research and now used throughout the United States makes it possible to apply techniques of modern agricultural science to individual farms, since more than 8000 different soil types have been identified. The classification furnishes an accurate and orderly basis for assembling in usable terms the results of research and the experience of farmers. It permits prediction of crop adaptability, probable yields, and management requirements of specific areas of land. Experimental results or farmers' experience with one type of soil may have little or no prediction value for other soil types.

As well as providing a means of indicating the types of soil on certain areas of property so that farmers may choose practices suitable to the soil types, soil classification has played a major role in the development of programmes for soil improvement and conservation and for prompt adjustment of agriculture to meet fluctuating economic conditions.—K.O.

GOMES, P. Uma fazenda na região semi-árida. [**A farm in the semi-arid region.**] *Bol. Min. Agric., Brazil* **35.** 49-61. 1946. [Received 1948] **750**

The semi-arid region of Brazil is situated in the north-east and comprises a large part of eight different States. Advice is given on farming in this region. Dry farming is possible wherever there are deep soils, cotton, maize, mandioca, and sorghum all being cultivable. Sorghum should replace maize in the driest parts of the region. Irrigation of rice and horticultural crops is often practised, by means of water pumped from under the beds of dried watercourses or collected in reservoirs constructed with State aid.—G.M.R.

FARMING SYSTEMS

LONG, W. H. and DAVIES, G. M. **Farm life on a Yorkshire dale: a study of Swaledale.** 21 × 13. pp. 111. Clapham. Dalesman Pub. Co., 5s. 0d. 1948. **751**

Without claiming to be an exhaustive survey, the authors have thrown into high relief the characteristics of farming in an isolated and upland area. They have sketched in the background of a community which has had to adapt itself gradually to changing circumstance, and, in losing its lead industry, has become wholly dependent on farming for its living. The special circumstances of this upland area where the typical farm is small with some thirty to forty acres of meadow land in the river valley, rough grazing up the side of the dale, and moorland grazing rights attached, are delineated without comment. In attempting to give an objective account of farming practice, and in avoiding the modern tendency to reach too facile conclusions, a survey none the less fertile for thought has been produced. Some points would seem worth elaborating particularly the question of the balanced relationships on upland farms between numbers of cattle and numbers of sheep, and the advantages of small flocks of sheep from the point of view of flock care and profitability. From the labour aspect, too, these dale farms, relying chiefly on family labour, and giving small scope for the development of mechanical aids, are an interesting example of the adaptation of methods to circumstance, and while the result in profitability is not outstanding, information indicates that it is more worth while in the dale to be a single-handed farmer than to be a farm labourer, and that the returns are as high as from other such districts. The authors suggest, in conclusion, that in sheep and wool production, and the breeding of cattle for herd replacement, the dale has found its economic function, but add the corollary that some advantage might accrue from more attention to improved grass strains, and the further development of the poultry industry.

To those interested in the development of hill farming and the implications of the special traditions associated with it, this account of farm life in a Yorkshire dale will prove a suggestive study.—A. D. Hooper.

Tribe, D. E. **Danish farming.** *J. Min. Agric.* **55.** 483-7. 1949. **752**

The author gives a broad outline on farming in Denmark by describing a 15-acre farm in North Zealand and a 450-acre farm in Zealand.

The small farm was managed entirely by the farmer and his wife. A 7-year rotation of grasses and clover (1st and 2nd years)/oats/potatoes/wheat /fodder-beet/barley was practised. The eight Danish Landrace pigs were housed indoors. The average of milk from the 5 Red Danish cows tethered on temporary grass during the five summer months was 800 gallons of 4.5 per cent butter fat. Milking was done by hand and though the standard of mechanization was low, by possessing a self-binder, single-furrow plough, drill, mower and a set of harrows the farmer was fairly independent of his neighbours.

On the large farm one-third was in grass, two-thirds of which were in a 2-year ley and the remainder down for 7 years. Half the land was under corn and the remainder roots. Seventy-five Red Danish cows with 90 followers were kept, the former giving an average of 1280 gallons per lactation with 4.3 per cent butter fat. Milking technique was that of first wiping the udder with a warm cloth, applying the teat cups for 4 minutes, followed by stripping by hand. Milking was done three times a day. All cows were artificially inseminated. Five sunken silos of beet tops and grass and clover contributed to winter feeding. On lighter land fodder potatoes were grown for feed for the 20 Danish Landrace bacon pigs. Though this was one of the most progressive farms in the country there was only one tractor on the farm and modern equipment, such as combine-harvesters, etc. were looked upon as objects achievable only in the distant future. From this it would appear that Denmark has yet to realize the great extent to which mechanical devices can be applied to the production of milk and other livestock products.—K.O.

Wadham, S. M. **Difficulties of small-scale farming in Australia.** [contained in] Australia, its resources and development. Edited by G. L. Wood. 1947. 139-46. **753**

See Abstr. 1007.

Spafford, W. J. **Still wider rotation-of-cropping, for Lower North Districts.** *J. Dep. Agric. S. Aust.* **52.** 159-63. 1948. **754**

The report illustrates how the adoption of the rotation-of-cropping most suitable to any district or farm, not only leads to improvement in the crops grown, live stock maintained, and the reduction of soil wastage, but it permits of the best use being made of farm equipment and the more even distribution of labour.

Some reasons why rotation-of-cropping succeeds in increasing the economic returns from the holdings include, the provision of more economical plant food, reduced losses from diseases, insect and weed pests, the provision of a greater variety of fodder for farm live stock thus maintaining the organic matter content of the soil, and the variation in soil treatment as cultivation and manuring diminishes the danger of " hard pan " formation. Some crops are good preparation of the land for the following crops, for example, leguminous crops activate bacterial action, cruciferous crops with their deep rooting habit open up the underlayers of soil and others starve out disease, as illustrated by the oats/fallow/wheat rotation against take-all.

The progress attained with rotation-of-cropping in the Lower North district is described and it is pointed out that under the prevailing conditions not less than 1 cwt. of superphosphate per acre should be applied every year if the rotation system described is to be fully successful.—K.O.

HEADY, E. O., BROWNING, G. M., and WORCESTER, R. W. **The right rotation for your farm.** *Iowa Fm Sci.* **3.** 9-12. 1948. **755**

When choosing the best rotation for a particular farm the following principles should be considered :—the effect that grain and forage crops in rotation have upon yield and production of each other ; the amount of forage crops that can be substituted for grain and feeding live stock ; the price and production cost of grain compared with forage. Then on the basis of prices, feeding efficiency, and organization of the farm business, the one which offers the most profit can be selected —K.O.

CROPS AND CROP PRODUCTION

WELDON, M. D. **Some problems of agriculture in Western Europe.** *Proc. Soil Sci. Soc. Amer.* **12.** 9-12. 1947. **756**

Immediately prior to, and during the early stages of the 1939-1945 war central and western Europe were producing more than ever before, but at present they are largely dependent upon imports. The problem of increasing food production there again, is of importance to the United States on economic as well as on humanitarian grounds, as exports to Europe have been largely responsible for the shortage of feed grains and high prices of foodstuffs in the States.

The soils of western Europe, though not naturally fertile, are readily responsive to good management practices. They have been maintained in a productive state by the use of rotations, lime, manure and fertilizers. The possibility of converting forest areas to food production has been considered, but was found to be impractical as forest products are even scarcer than foodstuffs and the forest soils in general are inferior for food production. The conversion of pasture land into cultivated crop land may be feasible in cases where poor drainage occur. Drainage of such land would improve meadow and pasture productivity and also enable a crop rotation to be brought into operation. Productivity could be most easily increased if larger amounts of artificial fertilizers were available, but the shortages brought about by the war have not yet been overcome. The war has also had a deleterious effect on seed supplies, seed certification schemes, and on much of the experimental work. Iron and steel shortages have led to a scarcity of farm implements and machinery. Crop rotations are generally practised, but in some areas specialize largely on wheat production, regardless of the soil, and to such areas a demonstration farm system, combined with an agricultural extension service programme would be of value. In some areas storage of farmyard manure is not efficient, much of the plant nutrients being allowed to drain away. Dr. Karl Imhoff has designed manure digesters capable of producing gas (mainly methane) which could be used for fuel for farm tractors and motors. The system of land ownership where a farmer may have his fields scattered in different directions around a village is inefficient. Farm consolidation offices have been set up to cope with this problem and the holdings of the farmers have been largely redistributed, so that while the total acreage of any farmer and his soil types remain the same, he has his fields in a much more compact area. Production has been increased by 20 to 25 per cent by this means. Finally the agricultural advisory system needs reorganizing.—T.D.H.

SARFATTI, G. La legge inglese sull'agricoltura. [**The English law on agriculture.**] *Ital. agric.* **85.** 270-2. 1948. **757**

The present British legislation on agriculture is briefly explained and commented on for the Italian readers.—E.B.

ATHERTON, D. O. **Native agriculture in New Guinea.** *J. Aust. Inst. agric. Sci.* **14.** 107-12. 1948. **758**

The principal aim of the native agriculturist is to produce food for the family or others in the village community. The people of New Guinea have a very dull diet which is deficient in salt, and particularly animal protein, for the only animals kept are pigs and hens which are far too precious to be killed for human consumption. Fishing and prawning provide the coastal people with some additional food. Despite the occasional yields from the hunting and fishing activities the gardens are the principal source of food, and they are an essential part of every village.

The garden is constructed, fenced and planted, but will only supply the family for one year ; after that the weeds, grasses, and shrubby undergrowth reclaim the garden. Before the old garden is quite finished a fresh piece of land is cleared, burned off, fenced and planted as before. Thus the fundamental rotation is, rain forest or jungle for some years, crops for a year or two, then back to the jungle. In most cases the gardens are given no protection against the attacks of insects and rodents, and the selection of tools available to the native agriculturist does not extend beyond the most simple tools, thus making the maintenance of the gardens very difficult.

Coconuts, sweet potatoes, sago, bananas, yams, taro and cassava are the chief crops. There is a notable absence of grain crops, chiefly owing to the climate, but also there is the question of comparative yields, for the obvious bulk obtained from crops such as sweet potatoes, has much more appeal to the native than the ton or so of grains per acre.—J.T.B.

McKeon, C. J. **Some impressions of agriculture in the United States of America.** *J. Aust. Inst. agric. Sci.* **14.** 113-8. 1948. **759**

The favourable yields of the major crops in America in 1946 are shown by the following figures: maize, 3300 million bushels; wheat, 1550 million bushels; oats, 1500 million bushels; potatoes, 475 million tons; and barley, 263 million bushels.

The most striking features of agriculture in America are the high percentage of arable land, leading to intensive settlement and the attendant amenities of electricity and good roads, and the extensive hand-feeding of stock on the farm. The soybean industry flourishes mainly because it provides edible oil, and meal for feeding stock. The treatment of the beans is by either the expeller or solvent extraction method. The soybean is very sensitive to soil and climate and its requirements are similar to those of maize. In the early stages of the industry, diseases caused little concern, but in recent years, some have reached serious proportions. The more important diseases are brown stem rot, bud blight, downy mildew, and halo blight.

Experimental work conducted by the Queensland Department of Agriculture and Stock over many years has shown that soybeans can be grown successfully in several parts of the State, but lack of suitable markets for the beans has prevented any development of the industry.

Fodder conservation in America is practised on a very extensive scale where severe winters are experienced, and in addition to silage, large quantities of lucerne and cereal hay are produced and stored in bales.

Associated with a wide interest in the mechanical harvesting of cotton has been the development of so-called stormproof varieties, which hold the cotton firmly even when fully mature, and research into the chemical defoliation of the plants to simplify the harvesting.—J.T.B.

Monsalvo, C. El Ministro de Agricultura expone su plan de labores. [**The Minister for Agriculture outlines his plan of work.**] *Agric. trop.* **4.** No. 4. 21-75. 1948. **760**

The Minister's address presents a clear outline of agriculture in Colombia and of its distribution in the 15 zones, corresponding to the 15 political Departments, into which the country is divided for the purpose of advisory and extension work. Each zone has its own agricultural advisory service. The principal crops are distributed as follows (the names are those of the respective Departments):

Cotton: Antioquia (research in progress); Atlántico (over 4 million kg. in 1947); Boyacá (third place for production); Magdalena (some 27 varieties in course of testing and acclimatization); Santander (important cultures, with emphasis on the use of selected seed); Tolima (selected seed used, production in 1946 was 1,411,077 kg. fibre and 2,848,138 kg. seed).

Rice: Antioquia (under irrigation); Bolívar (42,220 tons); Boyacá (not widespread, but annual production 991,450 kg.); Caldas (under dryfarming, production in 1946, 309,537 kg.); Cundinamarca (production, 1 million kg.); Magdalena (some 20 varieties being studied); Nariño (selected seed is being reproduced and distributed); Norte de Santander (the culture is of recent introduction but has good prospects, irrigation facilities being good, and different varieties are under trial); Tolima (approximately 11,000 ha. under rice, producing in two annual crops 25 million kg.; different varieties under trial); Valle (efforts being made to encourage the culture by distributing selected seed, etc.); Chocó (rice is the most important crop of this region, production 7200 tons); Meta (rice the principal crop, production 10 million kg.).

Wheat: Boyacá (excellent conditions for wheat, selected seed is being distributed); Cauca (central region, selected seed distributed); Cundinamarca (wheat is one of the most important crops, and selection and research is done at the regional Experiment Station of La Picota; annual production 23 million kg.); Nariño (wheat is one of the principal crops, the use of selected seed encouraged); Norte de Santander; Valle (distribution of selected seed).

Maize: Antioquia (seed distributed); Atlántico (large scale cultivation, new varieties are tested and selected and disinfected seed made readily available); Bolívar (production, 68,342 tons); Boyacá (very important cultures, selected seed distributed at low cost); Huila; Magdalena (new bred strains being acclimatized); Norte de Santander (native varieties, but new varieties are under trial); Chocó (production 1400 tons); Meta (production, 7,412,137 kg.).

Other cereals: barley is grown in Boyacá, but more particularly in Cundinamarca (production 9,898,000 kg.), and experiments in the growing of rye are being made in Cundinamarca.

Sisal: Antioquia; Boyacá (2000 tons fibre); Caldas (important cultures); Cundinamarca (750,000 kg. fibre).

Cassava: Atlántico (where cassava together with maize is the staple food of the population); Bolívar (production 54,603 tons); Cundinamarca (production 49,200,000 kg.); Huila; Norte de Santander; Chocó (production 2100 tons); Meta (production 2,306,537 kg.).

Oil plants. Sesame is grown in Bolívar (production 2230 tons); Huila; Magdalena (26 varieties under trial by the Sevilla Experiment Station); Tolima (production, approximately 300 tons, has declined because of low prices, but the

Government has now fixed prices and distributed seed of tested varieties such as Venezuela 52, so that production is now expected to be doubled. The Armero Experiment Station is conducting research in sesame cultivation); Meta (a small amount exported). Soybeans are grown to a smaller extent in some parts, for example, Antioquia and Meta; and the Sevilla Experiment Station has introduced into Magdalena three varieties of groundnut which are giving excellent results.

Potatoes, horticultural and plantation crops are not considered in the above notes.—G.M.R.

ECONOMICS OF CROP PRODUCTION

SCOTLAND, Department of Agriculture, Farm Economics Branch. **Labour employed per holding.** By *R. Bennett Jones*. *Fm Econ.* No. 16. 11-3. 1948. **761**

Over half the total number of workers were employed on holdings with not more than 5 workers, the average number per holding being 3.42. Only 85 holdings had 30 or more workers each, and only one as many as 110. Hired men between 21 and 65 years averaged 2.46 per farm. Of the workers other than hired men, about one-third were ordinary casual and prisoner-of-war workers, and about one-quarter were women and girls in regular employment.

Family labour was responsible for nearly a quarter of the regular labour supply, and for about one-fifth of the total supply. A much higher proportion of family labour consisted of youths under 21 and women and girls, only 40 per cent were men between 21 and 65, compared with a proportion of 68 per cent for hired labour.

Casual labour provided less than one-fifth of the total labour force.

With small labour teams predominating, the scope for complete specialisation is not wide.—A.D.H.

SCOTLAND, Department of Agriculture, Farm Economics Branch. **Organization of arable farms 1939-40 and 1946-47.** By *E. Stewart*. *Fm Econ.* No. 16. 6-7. 1948. **762**

Data indicates that even in predominantly cropping farms a substantial proportion of the cash income is derived from the sale of livestock produce, though this proportion has fallen from 44.5 per cent of the total income in 1939-40 to 26.5 per cent in 1946-47. Compared with the first period, there was a 24 per cent drop in livestock production, more marked for cattle and pigs than for sheep and wool, and a 35 per cent increase in the crops sold, especially in the production of barley and potatoes.

These 19 farms are apparently becoming increasingly specialised.—A.D.H.

DURHAM UNIVERSITY, Farm Economics Branch Report No. M.28. **Farm costs of milk production on North Country farms 1947-48.** By *D. H. Dinsdale* and *T. Winter*. 1949. pp. 12. [Mimeographed] **763**

The farm management aspects of milk production are emphasized, for the extraordinary wide range in production costs cannot be accounted for by reasons which are all outside managerial control.

The costs of production were slightly more than in the previous year, for though charges for home-grown foods (now on a cost basis) worked out lower, labour costs were higher. The year's margin of returns over cost was approximately £30 per cow and a shilling per gallon, the margin per gallon being higher in winter than in summer, but the margin per cow higher in summer due to the higher milk yield (55.6 per cent. of total yield). The average annual yield per cow exceeded for the first time since 1938-39, 600 gallons. The average herd life of a cow appeared to be four years.

Food accounted for 51 per cent of the costs. Oats comprised 77 per cent of the home-grown concentrates; 80 per cent of the purchased concentrates were compound cakes. Roots and greens (chiefly swedes and turnips) were fed to cows on all but one farm, and straw on all but eight. Only 8 herds received silage.

The average hours of labour per cow amounted to 152 for the year. Labour costs were 28 per cent of all costs.

Costs per cow and per gallon were on average lower for T.T. herds. Herds were larger, yields higher, and labour costs less due to the prevalence of machine milking, and these more than counterbalanced increased machine depreciation and repair costs. Evidently the managements who recognise the advantages of grading are those who are also alive to the importance of other factors by which profitability is favourably affected.

Of the total supply of milk, 64 per cent was produced at, or less than, the average net farm costs for the group. From the supply aspect, it is the costs of these marginal producers which determine the farm milk price.—A.D.H.

LEEDS UNIVERSITY, Department of Agriculture Economics Section. Fmrs' Rep. No. 78. **Winter milk production costs in Yorkshire 1947/48.** Leeds Univ. Dept. Agric. 1948. pp. 10. [Mimeographed] **764**

Rather less than half of the 69 herds for which the detailed costs of production from produce to middleman were recorded, were T.T. or attested herds, and most were of medium size.

Foodstuffs were easily the most important item of cost, and the cost of home-grown concentrates was considerably greater than that of bought foods. The average total costs per cow was £20 17s. 0d. or 15s. 5d. per gallon; of this £12 14s. 0d. was for home-grown, and £7 14s. 0d. for purchased foodstuffs, the remaining cost was for grazing. The range of costs per gallon between herds was not quite as great as the range in costs per cow. The range in milk yields suggests there is scope for increasing yields per cow, but there is nothing to indicate that size of herd had any effect on yields per cow, on costs of production or any other fact of production except in the case of the under 10 cow-herds where costs per cow and per gallon were considerably inflated by reason of the heavy expenditure on home-grown foods for which rationing by coupons is probably responsible.

Consideration of the effect of feeding roots showed that when more than 3 tons of roots per cow were given, increase of milk yield was slight but cost rose rapidly, and it is concluded that unless the growing of roots beyond this amount has a considerable value for the following crops in rotation, the land could be used more profitably for other crops.—A.D.H.

SMITH, J. H. **Supply and cost of labour on small farms.** *Fm Econ.* **6.** 5-7. 1948. [Nottingham Univ. Agric. Econ. Dept.] **765**

The sample of 476 small farms, representing over a scattered area, a wide variety of farm types, were essentially family farms, yet though only 15 per cent were operated solely by family labour, the total cost of hired labour represented less than two-fifths of the estimated cost of manual work including the imputed value of the labour of the farmer and his wife. Although more than three-quarters of the farms had the assistance of casual workers, wages formed only 11 per cent of the estimated total cost of manual labour. Forty-seven per cent of the farms employed casual labour only. Labour was regularly hired on 38 per cent of the farms, and cost 28 per cent of the total of all manual workers. The total estimated cost was £11 an acre, but nearly half of this was due to family labour. The data proved, however, that the importance of the cost of hired labour, both regular and casual, increased with the intensity of the system of farming, and that on the specialist types of farm it represented nearly half of the cost of all manual labour.—A.D.H.

BRISTOL UNIVERSITY, Department of Economics. N/S No. 47. **Notes on farm economics. Somerset group. Comparative tables of farming results for the cropping year 1947.** By *L. J. Hewett.* 1948. pp. 19. [Mimeographed] **766**

Though the highest margin of profit was in one of the two groups of dairying farms, and the lowest in the group of semi-arable farms with only some milk and livestock production, there was on the whole a decrease on the previous year for dairying farms and a small increase in the semi-arable group. " Farm Profits " (excluding the value of unpaid labour) showed the same trends. The value of production increased on most farms, notably for cattle, milk and sheep, but for crop production the increase was slight. The most profitable farms were those with a high production per 100 acres; the average total production was 2.75 to 3.25 times the labour (including unpaid labour) cost, and the highest margins were on those farms with the highest production per £100 labour cost. Total costs increased in all groups especially for workers' wages, machine maintenance costs, and general overheads. Comparison with previous years showed that increasing costs are now tending to exceed the increase in production. (See *Field Crop Abstr.* 1. Abst. 65).—A.D.H.

BRISTOL UNIVERSITY, Department of Economics N/S No. 48. **Notes on farm economics. North Somerset (Mendip and Flats) farms. Farming results for the cropping-year 1947.** By *V. Baker.* 1948. pp. 9. [Mimeographed] **767**

Of the 47 farms in the sample, just under half the farms were over 100 acres, the rest were evenly divided between under and over 70 acres. In assessing results, the farms were regarded as "producers " of profit rather than as sources of income to the farmers, and averaged an income of £500 the greater part of which, however, was accounted for by the value of the unpaid work. The average profit margins in the three acreage groups were found to be proportional to the acreage. There was a slight but insignificant tendency for margins to be lower in 1947 than in 1946, but in both years there were marked variations with margins, the larger farms being a little more stable. Group averages showed a declining average total "production " (or profit) per 100 acres from small to large farms accountable to some extent by the intensity of production in market garden produce, but in relation to margin per £100 total costs, intensive cultivation is shown in proportion to the rest. The " production " (or profit) on the majority of farms lies between £130 and £90 per £100 total costs.

As labour was a large element in costs, and the price of it is steadily rising, attention was drawn to the proportion of farmer's total costs attributable to labour and the amount of income produced for a given labour cost. In aggregate, it was found that a relationship does exist between profitability and " production " per £100 labour, and that to a small extent " production " per £100 labour tends to vary with size of farm—the small farm seeming to be less efficient in this respect. Labour as a percentage of total costs appeared to have no relation to profitability. Over half the labour was unpaid.

Another important feature emphasized was the extent to which the farmers' system of management depends on bought feed. The figure for livestock " production " per £ of feeding-stuffs reflects the extent of self-sufficiency and the economy in use of all feed which, however showed no significant relationship to profit. The small farms were most profitable where milk production was intensive and where there were more cows per acre, more gallons per cow, and a better price was obtained, even though milk was not a major factor in farm production. On the whole, the larger farms, those with lines additional to milk do better than those concentrating exclusively on it.—A.D.H.

Welsh Agricultural Organisation Society, Ltd. Ann. Rep. 1947. Univ. Coll. Wales, and Welsh Agric. Org. Soc. **Review of agricultural co-operation in Wales during 1946.** 1948. pp. 34-41. **768**

Though the volume of feeding-stuffs sold has fallen considerably since 1938, this has to some extent been offset by an increase in the farm produce handled. Potato and grain sales were 60 per cent of total sales, but a declining acreage indicates that these sales may not be maintained. It is evident that there is a dawning realisation of the scope for development in the poultry and wool industries. Though commodities handled were smaller in bulk, they were larger in variety.

The upward trend in prices enabled societies to improve their financial position despite the increase in expenses due to the fall in labour efficiency, the increase in wages, and the greater volume of office routine. The net surplus per £100 sales was higher in 1946 than in 1945, but while gross costs were lower, increased trading expenses nullified this considerably. Surpluses have declined since 1939, and point to the dangers that may arise when prices fall if the volume of goods handled is not increased.

The tendency of pre-war years to amalgamate smaller branches resulted in the reduction of the number of societies to 46 in 1946, but this has proved beneficial. Membership has increased and sales per member have almost doubled. Total sales by produce societies, and the sales per members were fewer in 1946 than in 1945. On the whole the Welsh Land Settlement societies maintained their position.

Education is the prime need of the Welsh Agricultural Organisation Society movement if it is to maintain a virile co-operative movement that can interpret and provide for the needs of the community.—A.D.H.

Ashby, A. W. **Co-operation and the needs of agriculture.** *Welsh Agric. Org. Soc. Ltd. Ann. Rep.* 1947. pp. 29-33. 1948. **769**

Since the supply of used, and usable land is not increasing as rapidly as the population, there is an urgent need for greater productivity by increased and more economical production, and for a planned productivity to ensure fair distribution. Consequent upon the necessity of achieving a balance of payments in international trade, any improvement in the livestock position must come from our own land, and is to be attained by using the most economical forms of production, more home-grown food, and by improving the quality of the food and of the live stock. Of first importance are the foundation cropping systems whether it be for grass or arable land, and the sufficient application of fertilizers. Much more attention to the conservation of grass by drying or silage making is also desirable. The aims of the co-operative societies should be to ensure adequate supplies of fertilizers, greater varieties of seeds for better yields, opportunities for developing grass drying and silage making, and livestock improvement. Only a few societies show an increase in the volume of goods handled, though there was a general increase in the sale of seeds and members' produce. There is evidently great scope for the marketing of eggs, fruit, vegetables and wool, and an important role for co-operation to play in the improvement of marketing and distributive operations.—A.D.H.

Louwes, H. J. Bedrijfsvergelijking in de landbouw. **Farm record analysis by means of farm comparison.** *Landbouwk. Tijdschr.* **61.** 76-93. [English summary pp. 92-3.] 1949. **770**

The results of a farm comparison study should be given in one of the following two ways: (a) the description of farm organization and operation of farms, or groups of farms, with different financial results; (b) the analysis of the data of an individual farm and suggestions for improving the management of this farm. How far the farmer can apply these suggestions will depend on the resources at his command. Only separate calculations, in budget form, on the basis of existing input/output relationships adapted to his farm can help him to approach optimum management.—From author's summary.

Rienks, A. **The re-planning of holdings in the Netherlands.** *Fm Econ.* **6.** 16-21. 1948. [Cultuurtechnische Dienst, Holland]. **771**

Since 1938 a new law which reduced the cost, and facilitated application for the re-planning of holdings in the Netherlands, has considerably speeded up the process. Following a hiatus during the war, operations were resumed shortly after the liberation, when not only was the legal basis changed, but the schemes assumed more the character of land improvement, and provided not only for the replanning of properties, but for road construction, drainage, the rebuilding of farmhouses and for co-ordination with general town and country planning.

Legal arrangements were made for replanning by agreement and for replanning by law. The first, depending on agreement amongst a minimum number of owners is not very popular; the second is executed by a Central Commission representing the Ministries of Agriculture, Finance, War, Public Works and certain other agricultural organisations, and operates after an official request is made by one-fifth of the owners affected or by a public body or agricultural organisation. After a majority decision by the interested owners, or on the direction of the Commission, a local commission assesses rights and compensation values of owners, obtains sanction for the plans from the Central Commission, and invites public comment. The state bears the cost of the commission, the land register, and meetings, but all other costs are apportioned amongst the holdings, and paid over a period of thirty years at five per cent.

The plans are executed by a land service under the Ministry of Agriculture though capital improvement is the responsibility of private owners and generally amounts to 25 to 40 per cent of the total cost. The remaining cost is usually met by subsidy from the state.

The aim throughout is greater productivity, but the beauty of the landscape is always kept in mind.—A.D.H.

VRIES, E. de. De landbouw in de Benelux landen in verhouding tot de landbouw overzee. [**Agriculture in the Benelux countries in relation to agriculture overseas.**] [Contained in] Rijkslandbouwhogeschool Gent, 25-jarig Jubileum 27-44. n.d. [Prof., Agric. Coll. Wageningen, Netherlands] **772**

In an address delivered on the occasion of the Silver Jubilee of the State Agricultural College at Ghent, Belgium, the author first gives a short historical account of agricultural development in the Low Countries from the middle ages to 1939, in which comparison is made with other countries. The pre-war agricultural economy of Benelux was characterized by the importing of a disproportionately large amount of grain and of some other products such as linseed and various plant oils and fats. In the Netherlands in particular, the success of agriculture was largely based on the conversion of cheaply imported grain and concentrates into animal and dairy products which were exported. The post-war situation is, however, quite different. Not only is it no longer possible to rely upon a flow of cheap grain and raw materials from overseas, but an increasing amount of competition from overseas is to be expected.

Three factors are discussed which affect the adjustment of Benelux agriculture to the changed conditions. (1) The sturdy character, adaptability and skill of the Benelux farmers, who from the Middle Ages onwards have been accustomed to free enterprise on their own relatively small holdings, often against very adverse conditions. (2) Government policy, which in the Benelux countries has always tended to support agricultural endeavour. (3) Overseas developments in agriculture. Intensification of cropping overseas has led to soil degradation, which again has led to an intensification of animal husbandry and to an unwillingness of countries which formerly supplied, say, grain and linseed, to export these commodities in a pure form. They prefer to supply meal, keeping the bran for their own cattle, or linseed oil, keeping the cake for their own animals. At the same time these overseas countries have become rivals in the furnishing of animal products to markets formerly supplied by Benelux. The situation is not likely to change, and although for the next few decades there will be no flooding of the world markets and international co-operation, especially by means of F.A.O., has improved, the present position provides a problem for Benelux to solve. Aids to solution which are enumerated include co-operative agricultural research, and educational and advisory work.—G.M.R.

BICKEL, W. **Swiss land distribution and land law.** *Indian J. agric. Econ.* **3.** 11-6. 1948. **773**

Swiss agricultural holdings, characteristically small in area, increased in size and decreased in number between 1905 and 1939. The number of leaseholds also was larger. This tendency followed the considerable efforts made to consolidate holdings which was accelerated by the Act of 1884 and furthered by the decrees of 1933, 1936 and 1940. It was made possible for two-thirds of the owners to seek permission to consolidate holdings, the Confederation paying a third of the cost and the Cantonal authorities assisting with subsidies. Cantonal Banks were founded of which the chief task was to provide capital for agricultural improvement schemes. Other decrees covered financial assistance for good but insolvent farmers, security of tenure and provisions against land speculation. The Law of 1940 gave some of these decrees a legal basis, and the draft law of 1947 seeks to complete the measure. It is, however, doubtful whether the restriction of property rights, and the prevention of the sale of agricultural land for non-agricultural purposes unless an equivalent area of non-agricultural land is brought into use, may not meet with opposition from not only land owners and some farmers, but from town planners as well.—A.D.H.

LONDON, UNRRA European Regional Office, Division of Operational Analysis. Operational Analysis Pap. No. 10. **Agricultural rehabilitation in Austria.** London, 1946. pp. 29. [Mimeographed] **774**

The economic effects of the change in 1918 from the self-contained Austro-Hungarian Empire to the small state of Austria are brought out in the introduction, and the history of agriculture in the inter-war period is reviewed. An account is given of the effects of the second world war on agriculture, the collection and distribution of food, and of the work of UNRRA in delivering seed, farm machinery, fertilizers, pesticides and veterinary equipment.—D.B.

NANAVATI, M. B. **Notes on co-operative farming** *Indian J. agric. Econ.* **3.** 17-26. 1948. **775**

Co-operative farming depends for its success on the choice of suitable land, the selection of members imbued with a common ideal and a cogent aim, efficient leadership and expert knowledge. Crop failures, high costs, inadequate incomes, friction between members, disunity and ignorance will lead to failure. In India there is, at present, scope for co-operative farming in refugee camps, or amongst capitalist landlords farming in conjunction with wage-earning, bonus-receiving workers. It can be instituted on cultivated land or newly reclaimed land but success will only be achieved through the patience and discipline of the workers, equality of opportunity for its members, adequate funds, state encouragement and education, the stabilization of prices, and the abandonment of the caste system. In cases where it is not feasible for agriculturists to combine directly to form a co-operative society, it may be possible to initiate the movement gradually through co-operation first for the purchase of supplies, from thence leading on to the consolidation of holdings, and a joint programme of cultivation until the final stage of collective farming can be entered upon. The institution of social services and other benefits may also considerably encourage participation. The landless worker and the smallholder in particular will need special inducement to appreciate the opportunities of co-operative farming and state ownership of land.—A.D.H.

KAVI, R. B. C. D. **Land problems of Gujarat (Part II.)** *Indian J. agric. Econ.* **3.** 27-40. 1948. **776**

A detailed study of the three main types of tenure—survey tenures, Inam tenures, and miscellaneous tenures—which exist in Gujarat, reveal the large proportion of land cultivated by tenants, and the inherent disadvantages under which they work. In the interests of agriculture and tenants alike the need for protective tenancy legislation, and the extension of the Bombay Tenancy Act (XXIX of 1939) to all districts is stressed. To check the evil of the increasing occupation of agricultural land by non-agriculturists, the consolidation of holdings, and their occupation by inalienable tenants, collective and co-operative farming or direct government supervision are suggested remedies. A synopsis of the protective measures already incorporated in the regulations of 1793, 1879, 1903, 1913, 1938 and 1939 indicate that progress, though gradual, is slow. Further lines of development are outlined.—A.D.H.

SINGH, V. B. **The problems of agricultural labour.** *Indian J. agric. Econ.* **3.** 68-72. 1948. **777**

The deterioration of conditions in agriculture due to the continued and increasingly feudal conditions of rural economy, and the growing numbers of non-cultivating landlords has led to an increase in the number of landless labourers, and has been accompanied by low wages, long hours, the use of child labour, and the evils associated with a peasantry oppressed by the bondage of debt which checks mobility and hampers organization for improved conditions. The problem is not one of wage fixation only, but of resettlement and rehabilitation, and for the acceleration of industrialization to absorb the surplus rural population. In the meantime, measures to relieve the debt burden, to prevent child labour, to regulate the duration of and the remuneration of work on the lines of the British model, and the organization of co-operative efforts in the villages would be a step in the right direction.—A.D.H.

CANADA, Department of Agriculture. Marketing Service: Economics Division. **An economic classification of land in the Elrose-Rosetown-Conquest area.** 1944. By *R. A. Stutt.* 1948. pp. 38. [Mimeographed] **778**

The investigation aimed at giving farmers a long-term estimate of quantitive returns from land that was classified as sub-marginal, marginal, fair, good or excellent wheat land. Results indicated a high degree of correlation between the assessed value per acre and the land class, and a wide range of average wheat yields between the soil types ranging from heavy clay to light loam. The average yield for the years 1921-1943 varied according to soil type from 8.8 to 18.9 bu. per acre.

Particular study of the marginal land class indicated that with average managerial ability on an average sized unit of production typical of this area, the farmer could anticipate balancing his costs by profits, provided there was no surplus required for rent or interest changes.

Additional information covers land tenure and soil erosion. Approximately one-third of the improved land was not affected by erosion, half had wind damage and the rest water, or water and wind damage. Wind damage was most pronounced on the poor grades of land, water damage on the heavier texture soils.—A.D.H.

ILLINOIS UNIVERSITY, College of Agriculture, Department of Agricultural Economics. **Summary of annual farm business reports of 2,519 Illinois farms for the year 1947.** *Ill. Fm Econ.* Nos. 159 and 160. pp. 703-29. 1948. **779**

Farm earnings were higher in World War II than in World War I, and instead of falling as in the first post-war period, continued to increase, so that the highest average income since 1933 on these farms was obtained in 1947. This was not, however, a normal progression but was made possible by the unusual coincidence of a price increase with a high level of production. In future the net income is likely to decrease as the farming costs rise more rapidly than farm prices. Net cash incomes an acre were 19 per cent higher in 1947 than in 1946, and four times higher than the 1935-9 average. Cash income per farm and expenditure per farm were the highest in the history of farm accounting. The total cash income in 1947 increased more than cash expenditures, and the cash balance was eight times greater than the average for 1932 (year of depression). Expenditure was higher because of the higher prices paid for feed, live stock and supplies, the necessity of purchasing an increasing proportion of materials needed to operate the farm, and the upward trend in the size of farms. Managerial ability and the physical capacity of the farm seemed the chief factors affecting the wide variations in earning. The increase in inventories was much greater than the increase in cash income in 1947.

On the basis of further data, the conclusion was reached that it pays to intensify farm production as long as the efficiency of the major enterprises does not suffer unduly. The report also includes information on the effect of quality of land on crop yields, and the returns for feed for different classes of live stock.—A.D.H.

ONTARIO Department of Agriculture. **Ontario's Co-operatives 1946-47. A survey of co-operative business organisations in the Province of Ontario 1946-47.** By *J. E. O'meara.* 1948. pp. 80. **780**

The report covers the nature, functions, membership, financial structure, and other data of 228 co-operatives actively engaged in business during 1946-7. Of these, 29.8 per cent were concerned chiefly in marketing enterprises, 59.7 per cent in distribution, and 10.5 per cent in services of various types. Twenty-nine co-operatives were marketing fruits and vegetables, 27 live stock and livestock products, and 19 dairy products. By far the greater number of distributing co-operatives were engaged in handling supplies of grain, seed and feed for the farm. The most common service rendered was the mill service, and cold-storage service. Two co-operatives were mainly concerned with seed cleaning. Information is given also of farmer-owned cheese factories, mutual fire insurance companies, clubs and bargaining associations run on a co-operative basis.—A.D.H.

MONTANA Agricultural Experiment Station. Bull. 449. **Montana farmer co-operatives, 1941 and 1946.** By *H. F. Hollands.* 1948. pp. 55. **781**

The number of Farmer Co-operative associations in Montana which covered a wide range of businesses, increased from 232 in 1941 to 257 in 1946. An increase was apparent in the number of oil and elevator co-operative associations which formed 65 per cent of all co-operative associations in Montana, but the greatest increase was in the number of co-operatives associated with groceries and general merchandise which did the largest volume of business. The associations for wool, and the creameries decreased in number. Elevator associations were chiefly concerned with grain, particularly wheat. Evidence collected showed the need for good management (poor management was responsible for the failure of 51.4 per cent of the elevator associations closed), for much improvement in the educational programmes of the associations, and for more efficient service.

Considerable information on the organization, business and sales of all other types of co-operative associations is also given.—A.D.H.

MACHINERY AND EQUIPMENT

SCOTLAND, Department of Agriculture, Farm Economics Branch. **Combine harvesters in South-East Scotland, 1944-47; a four-year comparison of the costs and performance of nine identical machines.** By *H. Christine McIver. Fm Econ.* No. 16. 7-8. 1948. **782**

An increase in the speed of combining and in the acreage combined, together with a decrease in the cost of petrol accounted for by a lower price in 1946 and a lower consumption in 1947 counterbalanced not only the increase in the labour and overhead charges, but the effect of the wide variations in weather, so that the costs per acre of bagging, carting and dressing were almost the same each year.—A.D.H.

LONDON, National Farmers Union. Interim Report. **Tractor costs survey. n.d.** pp. 8. **783**

Prefaced by a brief account of previous surveys of tractor costs, the report outlines the scope of the present survey begun in October, 1946, indicating the method of selection and geographical distribution of the sample taken, and the extent of the information collected on the time sheets. In addition to the provision for regularly recording the number of tractor hours, the fuel consumption and the driver's wage, an initial record was made classifying tractors according to power, their drivers according to age and status (whether owner or employee), and the farms by acreage and soil type. Rather more than half the 830 tractors in the sample are working on medium soils, more than a quarter on heavy and the rest on light soils, and more than half the tractors are of medium type with the remainder fairly evenly distributed between light heavy and track-laying types. On farms in the smallest acreage groups there are three times as many machines to a given area as in the over 300 acre group, and 50 per cent of the drivers are also owners. Only the possible value of the information in assessing the various aspects of tractor costs is indicated, since the value of ultimate conclusions must depend on the number of tactors recorded for the full twelve months.—A.D.H.

FOLLEY, R. R. W. **The economy of the two-wheeled tractor.** *Fm Econ.* **6.** 8-9. 1948. [Oxford Univ. Agric. Econ. Res. Inst.] **784**

Emphasis is laid on the versatility of the two-wheeled tractor which conduces to a greater continuity of employment, and in its multi-purpose adaptability serves to provide power for working the chaff-cutter, the grinding mill, or the saw bench, in addition to its other operations. On a farm between twenty-five and seventy acres especially, it has the advantage of being able to replace the work of two horses at a slightly faster rate, and at a cost slightly higher than the cost of keeping one horse. The cost must, however, be off-set by the low maintenance requirements, and the saving of time, food and grazing land.—A.D.H.

WRIGHT, S. J. **Does deep tillage justify the extra cost?** *Fmg* **3.** 49-51. 1949. **785**

The article describes experiments with deeper tillage operations and points out some of the advantages and disadvantages of the system.

Whether deeper tillage will become, and remain, common practice is doubtful until scientific experiments have answered the outstanding questions. Some deep ploughing has been highly beneficial and many farmers are likely to practice it on some occasions. As the costs of regular deep working will be high the proof of real and consistent benefit will have to be definite before the practice becomes general.—K.O.

BROWN, A. L. **An improved spray machine for experimental plot and field work.** *Agron. J.* **41.** 47-8. 1949. [U.S. Southern Great Plains Field Station, Woodward, Okla] **786**

A machine required to spray experimental plots, must be mobile, strong, economical, easily calibrated and capable of delivering small quantities of spray with a minimum amount of waste. In order to obtain such a sprayer a commercial machine was modified, tested and found to be capable of spraying successfully plots as small as 150 × 20 feet, as well as large fields and acres of sagebrush pasture land. The modified machine is described.—T.D.H.

SEEDS

FINDLAY, W. M. **Buying seeds.** *Trans. Highl. agric. Soc. Scot.* 5th. Series. **60.** 1-30. 1948. **787**

When purchasing seeds attention should be paid to the source of seed, variety or strain, purity, germination, bushel weight, size of seed, appearance, degree of freedom from disease, and the price. These factors are discussed together with Real Value, grass and clover strains in relation to earliness, persistency, palatability and place in the compilation of seeds mixtures. The legal aspect of seed sale is discussed and the major relevant points of the Sales for Agricultural Purposes Act, 1869, the Merchandise Marks Act, 1886, and the Seeds Act, 1920 are outlined.—T.D.H.

ALFANI, A. Lo scambio internazionale dei semi secondo le analogie agroclimatiche dei vari paesi. [**International exchange of seeds according to agroclimatic analogues of the various countries.**] *Ital. agric.* **85.** 125-7. 1948. **788**

An account on the subject is given with particular consideration to the work carried out by the Food and Agriculture organization of the United Nations.—E.B.

DISEASES, PESTS AND PARASITES

MAANDBLAD voor de LANDBOUWVOORLICHTINGSDIENST. Literatuurlijst plantenziekten. [**List of phytopathological literature.**] *Maandbl. LandbVoorlDnst* **6.** 170-5. 1949. **789**

A selected list of publications dating from 1945 onwards. A long section (pp. 172-4) deals with deficiency diseases.—G.M.R.

FLIK, H. M., and SAALTINK, G. J. Ziekten en beschadigingen bij landbouwgewassen in 1948. [**Diseases of and damage to field crops in 1948.**] *Maandbl. LandbVoorlDnst* **6.** 96-107. 1949. [Phytopathological Service, Netherlands] **790**

This short account is arranged according to the crop plants affected.—G.M.R.

PEGLION, V. Panorama fitopatologico. 2. Profilassi biologica. [**Phytopathologic panorama. 2. Biologic prophilaxis**]. *Ital. agric.* **86.** 3-13. 1949. **791**

Control of plant diseases by means of selection of resistant varieties is examined in relation to rust, loose smut, bunt of wheat, lucerne diseases, and sugar beet disease caused by *Cercospora beticola.* Boron deficiency in sugar beet and copper deficiency in wheat are also considered.—E.B.

RUSSO, G. Arvicole: come si combattono. [**Field mice: how to combat them.**] *G. Agric. Domen* **59.** 54. 1949. [Phytopathological Observatory of Portici] **792**

An infestation of *Pitymys Savii* on meadows and cereal cultivations in Campania is reported. This species differs from the common field mouse, being smaller, with short tail and round head, and having different habits. A control measure consists in sprinkling fields and meadows with sodium arsenide (700 grm. in 100 litres of water). This treatment can be applied from November until February, before the formation of the culm (the leaves become yellow but the plant dies only if the culm is formed). Sprinkling must be carried out when the leaves are dry and repeated after rain. Animals can be fed on the treated grass only when a strong rain has cleared the poison away. After the formation of the culm, poisonous baits can be used at the rate of 40 kg. per ha. Baits are prepared from damaged cereal grains or beans mixed with zinc phosphide or sodium arsenite. The Ministry of Agriculture has made compulsory in two provinces the control of this pest.—E.B.

WEEDS

HOLMES, E. **Economics of weed control.** *Fmr and Stk-Breed.* **63.** 35. 1949. **793**

In a paper to the Farmers' Club, Mr. E. Holmes, stated the reasons why the older chemicals —arsenical compounds, coal tar emulsions, and chlorates, were unsatisfactory. Referring to the new hormone weedkillers the author described the history of research culminating in the evolution of Methoxone, Agroxone, and 2,4-D.

Though time of application of the weedicide is unimportant when dealing with susceptible weeds, such as charlock (killed from emergence to flowering stage) treatment of stronger weeds such as docks and ragwort, is required in the seeding stage. Thistles should be treated just before flowering. The susceptible weeds require from 1-2 lb. of active material per acre as compared with over 2 lb. for docks and thistles.

There is a large future for hormone weed killers on grassland—especially in the control of buttercup. A complete control of weeds with little deleterious effect on clover may be obtained if there is a canopy of crop plants and weeds over the small clover. Linseed is safe for treatment between the heights of 4 and 12 in. Costs of application vary from 25 to 50 shillings according to whether the farmer or contractor applies the product.

Concluding, the author gave a warning of the hazards of applying these weedicides to some varieties of oats and Scandinavian barleys.—K.O.

RADEMACHER, B. Gedanken über Begriff und Wesen des "Unkrauts." [**The concept and nature of weeds.**] *Z. Pfl-enkran Pfl-enschutz.* **55.** 10. 1948. [Inst. for Plant Protection, Agricultural College, Hohenheim] **794**

From the biological standpoint weeds are plants occurring in association with cultivated plants which are tolerated by or are even vital for the weeds. From the economic standpoint weeds can be defined as unwanted plants growing in the cultivation and there doing more harm than good. Weeds of cultivated crops are those which can stand breaking up of the land and which flourish on the consequent soil aeration. Such are the short-lived plants growing from seed and those with perennating organs. They have several methods of reproduction and are well equipped for the battle of life. The number of weeds which are polyploids is remarkably high. Weed species have a wide distribution ecologically both as regards soil and climate, and with the spread of cultivation they extend all over the world, avoiding only the tropics.—D.B.

WINDERS, C. W. "**Hormone**" **weedkillers.** *Qd agric. J.* **67.** 195-9. 1948. **795**

The article describes the method of application and effect of hormone weedkillers on plants, quantity required, method of application and precautions to be taken. The brands on the Queensland market, their prices, and the form in which they are made are described. They include; Methoxone, Hormex and Weedone—liquids to be diluted with water; Vallo 2,4-D, Hardy's 2,4-D, 2,4-Diweed—powders to be dissolved in water; Weedust—a dust form used mainly for lawns.

Lists indicate the susceptibility of plants to the various weedkillers and are under headings of readily susceptible, high percentage kill; somewhat susceptible, percentage kill variable; resistant, percentage kill small; crop plants which may be damaged, and crops resistant at ordinary strengths.—K.O.

CANADA Department of Agriculture. **Poison ivy and its eradication.** By *E. G. Anderson.* 1948. pp. 3. [Mimeographed] **796**

After describing the morphological characters of poison ivy, and the toxic principles causing the rash in humans, the article continues with measures for prevention and eradication of the weed. Control methods are under the following headings:—digging, grubbing or spudding—for small patches, or isolated plants in non-rocky soil; horse, tractor or roto-tiller cultivation; Ammate used at the rate of 1 lb. per gallon of water; Atlacide used at the rate of 1.5 to 2 lb. per gallon of water; Stephen Weed killer—made by dissolving 1 lb. sodium chlorate and 1 lb. Elephant Brand ammonium sulphate in 1 gallon of water; ester type of 2,4-D as a spray. Spraying operations should not be carried out on a windy day and the sprayer should be thoroughly cleaned after use.—K.O.

ROBBINS, W. W. Control de las malezas. [**Weed control.**] *Rev. argent. Agron.* **15.** 257-60. 1948. [Prof. Bot., Fac. Agron., Davis, U.S.A.] **797**

Summary by *Maria J. M. de Gibert* of a lecture delivered to the Faculty of Agronomy and Veterinary Science in the University of Buenos Aires. A large number of herbicides are classified as general non-selective contact weedkillers, selective contact weedkillers, translocation weedkillers, and soil sterilizers, temporary and permanent.—G.M.R.

CRAFTS, A. S., and EMANUELLI, A. **Combination of 2, 4-D with fortified oil-emulsion contact herbicides.** *Bot. Gaz.* **110.** 148-54. 1948. [Univ. Calif., Davis and Puerto Rico Agric. Exp. Sta., Rio Piedras] **798**

A combination spray consisting of a straight fortified oil-emulsion spray and 2, 4-D proved effective against grasses (*Cyperus rotundus*) and dicotyledonous weeds of sugar cane fields. Tests show that this spray is also useful in maize fields. There is a great similarity between these two plants. Pre-emergence treatment followed by two or three sprays may solve the weed problem in these two crops.—D.B.

CEREALS

GOSI, L. Lo stato attuale della maiscoltura italiana e i tipi ibridi. [**The present condition of Italian maize cultivation and the hybrid types.**] *Humus, Milan* **5.** 12-15. 1949. **799**

Maize in Italy is the most important cereal after wheat, and occupies 1,280,000 ha. in spring cultivation and 170,000 in summer cultivation. This article examines environmental conditions, cultural methods and varieties at present cultivated. Production is dependant to a large degree, upon the rainfall of the latter end of spring, and the beginning of summer. Selection of hybrid maize from the varieties grown in Italy and cultivation of American hybrids are discussed.—E.B.

ZETTERBERG, O. Höstsädesarealen minskad med 16 procent. Några resultat från arealinventeringen oktober 1948. [**Area of autumn-sown cereals reduced by 16 per cent. Some results of the area inventory in October, 1948.**] *Lantmannen Svenskt Land* **33.** 54-5. 1949. **800**

Within the 20 provinces investigated, which comprise practically the autumn grain area of the whole kingdom, a total of only 308,300 ha. has been sown with autumn grain compared with 366,100 ha. in the autumn of 1947, a reduction of 57,800 ha. or nearly 16 per cent. The autumn wheat area has declined by 28,300 ha. or 14 per cent and the autumn rye area by 29,600 ha. or 18 per cent. Results for the different provinces show that the area reduction for both wheat and rye has been particularly marked firstly, in a westerly area comprising the provinces of Göteborg and Bohus, Älvsborg and Värmland, secondly, in an easterly area, namely in the provinces of Östergötland, Södermanland, Uppsala and Västmanland.

A considerable part of the area used otherwise for autumn grain was in the autumn of 1948 assigned to the economically favourable cultivation of oil crops, which shows a very marked extension. The cultivation of autumn rape has in comparison with the autumn of 1947 increased by 22,000 ha. and now comprises nearly 38,000 ha. The cultivation of autumn "rybs" (*Brassica rapa oleifera*) has been extended by 2500 ha. and now comprises 3700 ha; the greater part of this area is on Gotland.—R.P.J.

PFAFFENBERG, K. Getreide- und Samenfunde aus der Kulturschicht des Steinzeitdorfes am Dümmer. [**Discovery of cereal grain and seeds from the cultivation layer of the Stone Age village on Lake Dümmer.**] *Jber. naturh. Ges. Hannover* 69-82. 1947. [Vorwohlde, Niedersachsen] **801**

In the early Stone Age village buried under the north bank of Lake Dümmer in North-west Germany the carbonized plant remains reveal that wheat was the most important of cultivated plants. Species named are *Triticum compactum*, *T. monococcum*, and *T. dicoccum*. Barley (*Hordeum sativum*) was less important. A list is given of remains of other plants, many of which are in the present-day flora. The evidence points to a neolithic agriculture.—D.B.

CANADA, Department of Agriculture. Fmrs. Bull. 27. **Oats in Canada.** By *R. A. Derick* and *D. G. Hamilton*. 1948. pp. 24. [Cereal Div. Cent. Exp. Fm., Ottawa] **802**

"The purpose of this bulletin is two-fold. It summarizes certain phases of results of experimental work with oats carried on by the Experimental Farm Service and it gives a brief history of the oat crop and discusses varieties, diseases, and other subjects of vital interest to the grower." The "other subjects" refer to the control of diseases and weed pests, oats in grain mixtures and for hay and pasture, lodging, hulless oats, winter oats, quality, drought, frost, shattering, and false wild oats.—K.O.

VAILLANT, M. Milieu cultural et classification des variétés de riz des Guyanes française et hollandaise. [**Cultural centre and classification of the rice varieties of French and Dutch Guiana.**] *Rev. Bot. appl.* **28.** 520-9. 1948. **803**

In French and Dutch Guiana rice cultivation is limited to the Maroni region, on the slopes of hills where the forest has been cleared and on the irrigated lands along the Surinam river, and is effected, often in association with manioc, by the descendants of the slaves imported from Africa during the 18th century. The varieties grown are still the ones imported at that time from Africa as no new introduction has since taken place. By this same way also sorghum, sugar cane and several species of yam have been brought from Africa to the new world. Classification and description of rice varieties is given as well as information on climate, soil and cultural methods.—E.B.

SIRRI, A. Orientamenti sui sorghi per la scelta di razze rispondenti alle varie esigenze ambientali. [**Directives on sorghums for the choice of varieties suitable to different environmental requirements.**] *Ital. agric.* 85. 573-7. 1948. **804**

Sorghum cultivation in Italy has been extended during war time. The author believes that there is advantage in maintaining it and draws attention to excellent varieties (for forage, grain and sugar) recently introduced from the U.S.A. Results of trials carried out on local and American varieties are reported. Sorghum for grain (which gives also a certain quantity of forage) can be useful in those Italian regions where maize cultivation is hindered by summer drought. —E.B.

ARRIËNS, R. A. L. L. De wereldgraansituatie. **The world grain situation.** *Jaarb. nat. Com. Brouwgerst* 12. 56-64. [English summary] 1948. [Dept. Planning, Hoofdbedrijfschap voor Akkerbouwproducten, Netherlands] **805**

World grain production from 1933 to 1948 is surveyed and the necessity for growing more cereals in Europe is stressed. Among aspects of the problem noted is "the conflict between requirements for human consumption and those for animal feed. . . . . This is felt especially in countries like the Netherlands, which for many years have been largely dependent on the import of foreign grain for conversion into animal products."—G.M.R.

URUGUAY, Ministerio de Ganaderia y Agricultura, Sección Economia y Estadística Agraria. Publ. No. 96. Recopilación de la estadística agrícola del Uruguay. [**Summary of agricultural statistics for Uruguay.**] By *R. Christophersen.* 1948. pp. 103. [Secretary, Secc. Econ. Estad. Agrar., Ministerio de Ganaderia y Agricultura, Uruguay] **806**

The statistics cover the years 1937 to 1947 inclusive, but retrospective returns are also given of the area and production of some winter crops, wheat, linseed, oats, barley, canary seed (*Phalaris canariensis*) and rye, back to 1898-99, and of some summer crops including maize (back to 1900), groundnuts and lucerne (to 1916). Cereals (1947) occupy 675,000 ha., wheat being the most important with an area of 371,000 ha.; and of industrial crops linseed occupies the largest area with 149,000 ha., followed by sunflowers, groundnuts and lucerne. Returns of agricultural machinery in use in 1946 are added. A useful glossary gives the equivalent of Spanish agricultural terms in French, English and Swedish.—G.M.R.

TOFANI, M. Protezione del grano? [**Protection of wheat?**] *Ital. agric.* **86.** 14-6. 1949. **807**

In discussing the problem of increasing cereal imports or of maintaining a customs duty on wheat in order to stimulate internal production, a central solution is proposed. About 7 million hectares should be kept under cereals of which 4.5 million would be under wheat. Fluctuation around these figures should take place in relation to particular contingencies. By increasing the area under wheat to 5 million ha. and with pre-war yields per unit, cereal production could reach 113 million q. which amount could meet to a great extent the requirements of the country.—E.B.

KELLY, W. S. **The Australian wheat industry.** [contained in] Australia, its resources and development. Edited by G. L. Wood. 1947. 119-28. **808**

Some of the natural advantages Australian wheat farmers enjoy in the areas favourable for wheat production are the more effective use which can be made of large agricultural implements, because of the size of the field, and climatic conditions help greatly in mechanization. The combination of these conditions makes possible a remarkable economy in man power. Though cost of drainage is seldom incurred this is offset by making provision of drinking water for stock. Long, dry, summers permit effective use of combine harvesters. When bagged the wheat is sufficiently dry to be marketed at once.

The pastures grown in rotation with wheat comprise chiefly annual grasses and clovers. When hardy reseeding annuals such as Wimmera ryegrass, and the better clovers and medics are established, they persist and thus the cost of subsequent pasture is limited to the fertilizer applied. The rotation now being increasingly adopted is fallow/wheat/oats or barley/ 2 years grazing. Many farmers on wheat areas are now successfully using peas in their rotation and in many areas lucerne is lightly sown with wheat. This provides good auxiliary feed for 3 to 5 years and will greatly increase the fertility of the soil.

The author describes some of the "bad times" which have been experienced by Australian wheat growers and the resulting losses in soil fertility, by overcropping and soil erosion. The policy of unwise expansion into unsuitable areas has brought a difficult problem, and much of these lands must revert to light grazing. But there still remains the great bulk of wheat growing areas where, with sound farming practice, a healthy and permanent agriculture should be maintained. See also Abstr. 1007.—K.O.

WATT, R. D. **The problems and possibilities of wheat-growing in Australia.** *Emp. J. exp. Agric.* **16.** 187-94. 1948. **809**

Wheat is grown where rainfall is 10 to 15 in. during the growing season; an area of 155 million acres satisfies this condition, but soil is a limiting factor. In large areas phosphorus is very deficient and superphosphate is almost invariably applied at 0.5 to 2 cwt. per acre in the drill. Yields, at one time very low, were increased by P manuring and the introduction of the cultivated fallow; they rose from 7.3 bu. per acre in 1891/1900 to 12.7 bu. per acre in 1941/47. Wheat growing at these levels is profitable because land is cheap, labour costs low through mechanization, and the grain is of desirable quality. The chief hazards are variability of the seasons and weed incidence, particularly skeleton weed. Seed-borne diseases are controlled or have been eliminated through plant breeding measures. Nearly half the wheat land of Australia has suffered through wind or water erosion and a campaign to combat erosion is in progress; the need for alternate husbandry is recognized and fat-lamb raising is probably the most promising adjunct to wheat growing. It is estimated that 20.5 million acres of wheat could be grown within 10 years yielding 13 bu. per acre, or a production of 266.5 million bu. yearly. The present output is about 132 million bu. a year.—K.J.S.

MARTINEZ, R. V. La producción de trigo en Colombia. [**The production of wheat in Colombia.**] *Agric. trop.* **4.** No. 4. 97-9. 1948. [Head of Section for Agric. Economics, Min. Agric. Colombia] **810**

According to the author, efforts to acclimatize wheat in Colombia have not been very successful and this is attributed to (a) the plant's physiological requirements, (b) the excessive humidity of the tropical situation, which makes wheat very liable to attack by *Puccinia*, and (c) the inferior chemical composition of wheat grown in the tropics compared with that grown in temperate regions. At the same time the amount of wheat imported is large and costly. It is suggested that the public be encouraged to keep to the native breads composed of plants such as maize, cassava, sorghum, sago, the yam, etc.—G.M.R.

PARDO, C. N., and GIRALDO, H. C. Contribución al estudio de los problemas del trigo en Colombia. [**Contribution to the study of wheat-growing problems in Colombia.**] *Agric. trop.* **4.** No. 9. 5-7 and 9-15. 1948. [Director (C.N.P.), and Agronomist, Wheat Section (H.C.G.), La Picota Agric. Exp. Sta., Dept. Cundinamarca, Colombia] **811**

The first part of this article touches social aspects of the Colombian wheat problem. The present wheat area is estimated to be approximately 180,000 ha., of which hardly 50 per cent is land really suitable for wheat and capable of producing an average yield of 1000 kg. per ha. The remainder is situated in unsuitable, exhausted hill lands where the smallholder, with very scant resources and family labour, raises a meagre 300 to 350 kg. per ha. There are, however, large areas of fertile, flat or slightly undulating suitable land at present almost entirely given over to stock raising. The fertile plains are largely in the possession of the big landowners. A plea is made for the betterment of the smallholders' opportunities.

The second part suggests the following measures for increasing wheat production and improving its quality. (1) The use of suitable land, if necessary enforced by legal action. If the cultures now found in some 90,000 ha. of unsuitable land were transferred to fertile plains (named) which are at present either entirely unused or used for grazing only, 160,000 tons of wheat, or more than sufficient to cover the country's requirements, could be produced. Numerous localities suitable for the culture are named, and the study of potentially valuable regions is considered desirable. (2) Protection of the grower, by means of strictly enforced laws, against exploitation by unscrupulous buyers. (3) Government assistance in procuring machinery and fertilizers, and in supplying advice based on demonstration, especially for the smallholder. (4) The use of classified, selected, or certified seed, in which connexion attention is drawn to varieties tested and selected at the Picota Experiment Station, adapted to various conditions and purposes. Finally, the necessity of avoiding the costly importation of wheat and conducting more local research into wheat-growing problems is emphasized.—G.M.R.

JAARBOEKJE van het NATIONAAL COMITÉ voor BROUWGERST. Voor de practijk. **Practical information.** *Jaarb. nat. Com. Brouwgerst* **12.** 81-7. 1948. **812**

This includes a list of eight requirements which malting barley must satisfy and advice to the grower on cultural technique.—G.M.R.

GOSI, L. Granoturchi precoci. [**Early maizes.**] *G. Agric. Domen.* **59.** p. 78. 1949. **813**

In the north of Italy often a maize crop follows lucerne, or red clover or white clover in the following rotation: 1st year, maize; 2nd year, wheat intercropped with a leguminous plant; 3rd., 4th. and 5th. year, a leguminous crop. There is the tendency among farmers of delaying the ploughing-up of the meadow in order to gain in spring, before the sowing of maize, 1 or 2 cuts of grass. Thus maize sowing takes place at the end of May, and varieties with short vegetative period (and lower yielding in comparison with the late varieties) must be used. Information on such varieties is given.—E.B.

KLERK, C. J. de. **Ploughless farming in Britain.** *Fmr's Wkly Bloemfontein* **76.** 61. 1949. **814**

Examples are given in this article, of the practice of cultivating and planting crops without the use of the plough.

Pilot wheat was planted in autumn on land unploughed for 13 months, which had grown moderate crops of wheat the two previous years. The seed was sown on a rough "rubbly" seed bed, in a covering of dead and dying weeds, churned up with a mixture of wheat straw stubble, by the disk harrow. The weeds flourished in the autumn, but died down in the spring and the wheat harvested in the summer was the heaviest crop ever grown on the farm. The same success was obtained with oats and vetches as a silage crop and kale for a green crop. The land was disked before seeding, and a dressing of sewage sludge was worked in. Thistles were removed by hand hoeing.

The author thinks that only on land which is not adequately supplied with organic matter and is therefore too hard and lifeless to make a good seedbed, is the plough a necessary preliminary to good cultivation.—K.O.

NEVANO, G. La coltivazione dell'avena confrontata a quella del frumento. [**Oat cultivation compared with that of wheat.**] *Ital. agric.* **86.** 36-42. 1949. **815**

Field trials have been carried out in 1946-47 near Melfi (Lucania) with oats. The following conclusions have been reached: (a) early sowing (beginning of October in these trials) with low density, assisted by chemical manuring, determines a rapid bunching of the ear during autumn; (b) low density of sowing is the first condition to obtain bunching; (c) chemical manuring including nitrates, is essential for the best utilization of moisture and temperature of the autumn and determines a strong vegetative activity before winter with plant bearing rich and bunched ears; (d) this technique (on the contrary to what takes place with wheat) does not increase damages due to rust and premature ripening, gives higher productions than the cultural technique usually followed, and can successfully be adopted if rain has taken place before sowing, because in such case there is no danger of exceptional weed growth during cultivation.—E.B.

MONTANA State College Agricultural Experiment Station. Circ. 190. **Recommended practices for soil erosion control.** By *A. E. Seamans.* 1948. pp. 7. **816**

Since 1940 over 2 million acres have been broken up for cropping in Montana, where available soil moisture is the chief limiting factor in dry land crop production. Yields of wheat over long periods are shown to be greatest after summer fallow. To control wind erosion on fallow land, stubble mulching and strip cropping should be practised; to control water erosion, stubble mulch is the most effective means. Contour strip cropping with grassed buffer strips is effective and grassed waterways are useful.—K.J.S.

MUKHERJEE, R., and CHATTERJEE, I. **The effect of calcium supplement on the digestion of organic nutrients in fodders in which lime content is either low or has a tendency of poor assimilation.** *Indian J. vet. Sci.* **17.** 85-8. 1948. **817**

Napier silage (*Pennisetum purpureum*), which is deficient in lime and Boro straw (*Oryza sativa*), which has a tendency towards poor lime assimilation were fed to bullocks with and without a calcium supplement. Ether-extract was found to be the most susceptible organic nutrient to lowered digestibility. The addition of lime to the diet contributed towards a better lime assimilation and greater fibre digestibility in the case of Napier silage, but this was not true with Boro straw. No explanation is offered to account for this differential result concerning the fibre digestibility of the two fodders.—M.E.E.

MONROE, C. F., and KRAUSS, W. E. **Simple** *vs.* **complex grain mixtures in dairy rations. III. The effect of substituting ground ear corn for ground shelled corn in the simple grain mixtures.** *Bi-m. Bull. Ohio agric. Exp. Sta.* **31.** 65-73. 1946. **818**

The effect of feeding a simple grain mixture containing ground ear corn is compared with feeding a similar mixture containing ground shelled corn. There may be a slight financial advantage to be gained by feeding the ground ear corn, but in any case there was little difference between the two types.—T.D.H.

KRAUSS, W. E., and MONROE, C. F. **Simple** *vs.* **complex grain mixtures in dairy rations. IV. Heifer calves raised for replacements and veals for slaughter.** *Bi-m. Bull. Ohio agric. Exp. Sta.* **31.** 97-9. 1946. **819**

Calves performed just as well when fed, in addition to milk, a simple grain mixture containing equal parts by weight of whole shelled corn and whole oats, as when a complex mixture containing ground corn, ground oats, bran, linseed oil meal, soybean oil meal and skimmilk powder was fed.—From authors' summary.

Kristjánsson, K. K. Rit Landb. B-Flokkur. Nr. 1. Kornnaektartilraunir á sámsstodum og vidar. [**Experiments in the cultivation of grain crops at Sammstadir and other centres, conducted during the period 1923-1940.**] 1946. pp. 106. [English summary pp. 103-5] **820**

The cultivation of cereal crops was practised in Iceland from the time the country was settled until the beginning of the 15th. century, or for a period of 500 years. Gradually, owing to various reasons, the growing of these crops was given up. Recently, attempts have been made to induce Icelandic farmers to resume cereal crop cultivation.

The weather (particularly temperature and rainfall) during the last two or three months of the growing season primarily decides whether or not barley and oats will ripen. Based on records from seven weather stations covering the last 13 to 20 years the chances for barley and oats to ripen fully appear to be :

9 years out of 10 in the south and south-west part of Iceland,
3 ,, ,, ,, 5 in northern and eastern districts,
1 ,, ,, ,, every 2 in the western part of the country.

Experiments on time of seeding in Reykjavik (3 years) and at Samsstadir (14 years) indicate that Donnes barley gives the best results when sown from April 20th. to May 10th. Other varieties of barley and oats, tested in Iceland, have also given the best results when sown at this time. Since 1928 slightly more than 100 varieties of barley, oats, winter rye, spring rye, winter wheat, spring wheat and field peas have been tested. Of these crops six-row barley and early oats, when sown early, are most likely to mature.

Barley and oats frequently yield from 1800 to 2700 lb. of grain and from 3500 to 6000 lb. of straw per acre. Winter rye (Tonder rye) matures in seasons that are average or better, and has given a maximum yield of 1960 lb. per acre. Spring rye seldom ripens. In the best seasons spring wheat has matured fully, but it hardly ripens in an average season. Winter wheat has reached a fair maturity in an average season, and is preferable to spring wheat. Field peas have matured fully in an average season.

Diseases in cereal crops have not been much in evidence. Manganese deficiency symptoms have been noticed in oats. Barley has been attacked by rust (*Puccinia*) in some years (1935, 1937 and 1940). Loose smut (*Ustilago nuda*) and covered smut (*U. hordei*) often appear on plants grown from imported seed, but seem to disappear with continued cultivation from Icelandic-grown seed, although no preventative measures are taken. Experiments on rate of seeding indicate that with broadcasting, 160 to 180 lb. of good seed should be sown per acre. When the seed is drilled the rate may be slightly lower. Drilling is preferable to broadcasting. The former method has on the average yielded 6 per cent more than the latter. Experiments on depth of sowing indicate that the seed should be sown at a depth of from 1.5 to 2.5 in., particularly if sowing takes place early and precipitation is sparse.

As regards manuring, farm manure may be used, but it contains slightly too much nitrogen in relation to the other fertilizer elements, and delays maturity somewhat. Horse manure at the rate of 9 tons per acre, has given good results with barley.

Potassium fertilizers are necessary on drained half-bog lands. A rate of 180 lb. 40 per cent potassium fertilizer per acre has proved satisfactory. On naturally well-drained soils no potash is required in many cases. Phosphate fertilization is essential for cereals and hastens the ripening of the grain : 270 to 360 lb. of 18 per cent superphosphate per acre has been found adequate. Nitrogenous fertilizers are necessary, unless the soil is exceptionally fertile. A rate of 180 lb calcium nitrate per acre has given about 250 lb. of grain for 100 lb. of fertilizer that was applied : this is of the same order of magnitude as reported from Danish experiments. All fertilizers should be applied before sowing of the grain. A delayed maturity has resulted from the application of nitrogenous fertilizers after the seedlings had come up. Nitrophoska fertilizer (14-14-20) has given good results ; 180 to 220 lb. per acre, applied to a medium fertile soil, has proved satisfactory for barley. Chemical analysis on Icelandic-grown barley and oats indicates a quality that is very little inferior to that of identical varieties grown elsewhere.

From the trials and experiments described in this bulletin it is concluded that the growing of barley and oats can be practised in the milder climatic regions of Iceland. Although the corn may not mature in unfavourable seasons, it will yield as much nutrients to an acre as an average hay field.—R.P.J.

Elle, Th. Korndyrkingen. Forbered en god innsats for korndyrkingen til våren og velg de rette slag og sorter. [**Cultivation of cereals crops. Prepare for the cultivation of grain crops in the spring and select the right kinds and varieties.**] *Norsk Landbr.* **15.** 82-4. 1949. **821**

In Norway the dominant cereal crop is oats. In normal years before the war the area carrying this crop was nearly as large as that of all the other kinds of spring cereals together. The earliest varieties are Nidar and Nidar II. A slightly later group of early oat varieties is represented by Perle, Hein II and Ymer. Of these Perle is a few days earlier than the others. Where the degree of earliness is not the decisive factor, Hein II and Ymer as a rule give a slightly larger yield than Perle. All these early varieties grow well on the outskirts of the oat cultivation area where the early part of the summer is rather cool. They should not be sown too thickly as they are weak in the straw. Kytø, Bambu, Strind and Hird are medium-early varieties. Kytø and Bambu are the most generally grown in Østlandet, while Strind and Hird do best in Trøndelag and the coastal areas. In Opland Kytø has for a series of years surpassed Bambu in yield, particularly on land in good heart, while Bambu is slightly stiffer on ordinary mineral soil. Both are about 4 days earlier than Golden Rain II. Strind is recommended in Trøndelag particularly for clay soil in good heart, while Hird which is slightly lower yielding should be used where stiffness of straw is the primary consideration.

Of medium-late or late varieties Golden Rain, II, Søl II and Ørn may be mentioned for general cultivation. Golden Rain II is one of the most reliable and best varieties in Norway under mild cultivation conditions and is the variety most frequently grown in that country. It is suitable for the warmest and best grain districts in Trøndelag, Møre and in Vestlandet and in all the milder regions in Sør- and Østlandet. Under good cultivation conditions in the lower parts of Sør- and Østlandet the Swedish Ørn oat is usually superior to Golden Rain II in yield, but not in quality. On the average of a long series of years Ørn has yielded approximately 20 kg. more grain per dekar than Golden Rain II in the lower parts of Opland. There it is on the average 3 days later than Golden Rain II, but the difference becomes somewhat greater further towards the north. It requires liberal manuring and good cultivation conditions, but is considerably stiffer strawed than Golden Rain II. Sol II is a new Svalöf variety which appears to be able to compete with Golden Rain II in most respects. It is of about the same degree of earliness, but has as yet been tested on only a small scale.

The cultivation area of barley extends higher up into the mountains and further towards the north. Among the earliest and medium-early six-rowed varieties cultivated are Fløya, Edda, Jotun, and Maskin barley. Fløya grows furthest towards the north and highest up in the mountain region, while Jotun and particularly Maskin are widely grown in the lower mountain and valley districts. In most places Jotun gives a higher yield than Maskin, but the grain is not of so good a quality. The two closely related varieties Varde and Herse are slightly later and particularly suitable for all the middle regions. Recently Varde has been grown on a constantly increasing scale in Østlandet, while Herse has been used for preference in Trøndelag and in Vestlandet.

The old Asplund variety is still grown to some extent in the lowest regions in Østlandet and Sørlandet. In Trøndelag and in Vestlandet the newer varieties Fræg and Jadar II are coming into use. Where in the lower and middle regions barley can be sown comparatively early, two-rowed barley will as a rule give a better yield than six-rowed. Opal B was the first variety generally employed in Østlandet, but it has been superseded by Maja and Freja, which give a slightly larger yield. Other varieties are Ymer and the particularly stiff-strawed Goliat barley. Goliat is widely grown in Jæren and in the coastal regions in Sørlandet, but in the drier inland areas it gives a lower yield.

It has been possible in recent years to extend the spring wheat area in Norway with the help of new, earlier varieties. Snøgg II and Sopu are early varieties. Snøgg II is resistant to mildew and has given very good results in Trøndelag. Sopu is slightly later. Next in earliness come Fram II and Ås II, both of which are highly resistant to mildew.

Recently weather conditions have been favourable for ripening of the grain and the comparatively late Svalöf variety Diamant II has been widely grown in Norway's best spring wheat districts in Østlandet and Sørlandet. Where it attains to full development this wheat variety is both high yielding and stiff-strawed. Skirne is a new Norwegian spring wheat variety which in recent years has been grown to some extent in Trøndelag and particularly in Jæren. It is stiff-strawed, but does not appear to be particularly suitable for the drier Østland climate. Trym is also a new and high yielding spring wheat variety. It is slightly earlier than Diamant II and nearly as stiff in the straw. It is still difficult to obtain seed of this variety on the market.—R.P.J.

TENNESSEE AGRICULTURAL EXPERIMENT STATION Bull. 206. **Variety performance trials of oats, barley, wheat, corn and soybeans.** By *O. H. Long* and *S. F. McMurray*. 1948. pp. 16. **822**

The highest yielding oat variety in 1947 was Forkedeer with a 3-year average yield of 68.9 bu. per acre ; it is winterhardy but susceptible to rust. In barley, Jackson No. 1 (42.9 bu. per acre) is a smooth-awned type. In wheat, Carala (28.6 bu. per acre) is a short-strawed, early maturing, awnless wheat. Among maize varieties, the white corns are higher-yielding than the yellow corns. Dixie 17 led with an average of 85.9 bu. per acre followed by Tennessee 10 (84.3 bu. per acre). The highest yielding commercially available yellow corn was N.C. 27 producing 74.6 bu. per acre. Maximum corn yields in Tennessee are associated with prolificacy. Among soybeans Roanoke S-100 is an early-maturing variety and produced an average seed yield of 20.8 bu. per acre.—K.J.S.

HORBERG, Y. Weibulls Original Hertakorn. Ny förädling av högsta klass. [**Weibulls Original Herta barley. A new bred variety of the highest class.**] *Weibulls ill. Årsb.* **44.** 4-8. 1949. **823**

In the spring of 1949 this new variety was added to the Swedish assortment of two-rowed barley. Herta barley is the result of a cross between Kenia and the German malting barley Isaria. It is somewhat similar to Kenia in appearance, but has a slightly more erect growth habit and considerably stiffer straw. It is less leafy than Kenia. It possesses good yielding capacity, good malting barley properties and is free from any tendency to ear- and straw breaking. See also *Plant Breeding Abstracts*.—R.P.J.

HORBERG, Y. Tamnikorn. Ny finsk förädling för Norrland. [**Tammi barley. New Finnish bred variety for Norrland.**] *Weibulls ill. Årsb.* **44.** 33-4. 1949. **824**

On the initiative of Weibullsholm in 1945 official testing was begun in Sweden of the Finnish barley variety Tammi from Hankkijas Plant Breeding Station, Tammisto. It is derived from a cross Asplud × Olli barley and is like Asplund barley of star barley type. In trials at Weibullsholm the straw of Tammi was considerably shorter and stiffer than in Vega. On the average of 2 years trials at Weibullsholm, Vega received 5.3 marks for stiffness of straw and Tammi 9.0. As regards yield both varieties were equal at Weibullsholm, while Tammi ripened approximately 4 days earlier. Further in the Weibullsholm trials Tammi proved decidedly less susceptible to mildew than Vega.

Where varieties intended for cultivation in the most northerly parts of the country are concerned, too much importance should not be attached to yield and earliness results obtained in south Sweden. Average figures obtained in the official trials in the Norrland provinces show that Tammi barley has surpassed Vega as regards yield in all the regions for which Tammi is intended. As to stiffness of straw, on the average of 4 trials in 1946 Tammi received 7.7 marks and Vega 6.5, and during 1947 on the average of 6 trials Tammi received 6.4 and Vega 5.5 marks, when 10 equalled no lodging. See also *Plant Breeding Abstracts*.—R.P.J.

HAAN, H. de. Het instandhouden van gerstrassen, als schakel tusschen het kweeken en vermeerderen. **The maintenance of barley varieties as a link between breeding and multiplying.** *Jaarb. nat. Com. Brouwgerst* **11.** 21-8. [English summary.] 1947. [Plant Breeding Inst., Wageningen, Netherlands] **825**

See *Plant Breeding Abstracts.*

PRAKKEN, R. De brouwgerstveredeling in Zweden **The breeding of malting barley in Sweden.** *Jaarb. nat. Com. Brouwgerst* **11.** 52-6. [English summary] 1947. **826**

The article includes an account of the principal Swedish bred strains of malting barley. See also *Plant Breeding Abstracts*.—G.M.R.

BARTELS, A. M. M. Rassenproeven met brouwgerst 1946. **Varietal trials of malting barley in 1946.** *Jaarb. nat. Com. Brouwgerst.* **11.** 63-6. [English summary] 1947. **827**

Abed Kenia is the barley most commonly grown in the Netherlands. Of nine varieties tested for their productivity in comparison with Kenia, the new Swedish variety Balder made the most favourable impression, and it has now been entered in the national " List of Varieties " as recommended for use.—G.M.R.

WILTEN, W. Opbrengsten, rassenstatistiek en eigenschappen van brouwgerst. **Yields, varietal statistics and properties of malting barley.** *Jaarb. nat. Com. Brouwgerst* **11.** 67-74. [English summary.] 1947.

——— Opbrengsten, rassenstatistiek en eigenschappen van brouwgerst. **Yields, varietal statistics and properties of malting barley.** *Jaarb. nat. Com. Brouwgerst* **12.** 71-80. [English summary.] 1948. **828**

By means of tables, a map and a chart the yield of grain and straw of barleys grown in the Netherlands in the years 1946 and 1947 are given and compared with those of the period 1932 onwards, and distribution in the Netherlands is outlined. The great preponderance of the variety Abed Kenia, still increasing in 1947, is striking. The number of variety trials is also increasing, 13 in 1947 compared with 4 in 1946. Except in the regions which had been inundated the new variety Balder gives a higher yield than Abed Kenia, and Weibull 4744, Carlsberg and Lenta also gave strikingly good yields in 1947.—G.M.R.

WILTEN, W. De veldproeven in 1947. **Field trials in 1947.** *Jaarb. nat. Com. Brouwgerst* **12.** 65-70. [English summary.] 1948. [Breda] **829**

In continuation of the previous year's trials [see Bartels, Abs. 827] a prominent place was given to Balder in comparison with Abed Kenia under varying manurial treatment. Not only Balder but some of the other varieties tested, notably Weibull 4744, Carlsberg, Lenta and Hylkema 336/362, proved more productive than the standard variety. —G.M.R.

FENAROLI, L. I granoturchi ibridi. Prima introduzione e sperimentazione in Italia. [**Hybrid maize. First introduction and experimentation in Italy.**] *Ital. agric.* **85.** 146-69. 1948. **830**

After expounding the principles of maize hybridization, the author refers to field trials carried out in North Italy in 1947 with hybrid maize seed supplied by the F.A.O. In view of the fact that 7 or 8 years are required in order to obtain hybrid maize from local free-pollinated varieties, the possibility of adapting in Italy the American hybrid varieties and of crossing them with the best local varieties is under study. From one year's trials, although no definite conclusions can be reached, the following observations have been made: (a) the American hybrids have shown a great adaptability to the Italian environment and often yields have been higher than the normal ones of the American Corn Belt; (b) in a high percentage of cases they have yielded higher than the local control variety; (c) the increase in yield of the hybrids that have given the best performances are 32, 36, 54 and 117 per cent; (d) the behaviour of the same hybrids has been very dissimilar in the different environments.

It is foreseen that with the development of hybrid maize cultivation, a first increase of production of from 3 to 4 million tons will be obtained. A programme for production of hybrid maize seed in Italy is given. See also *Plant Breeding Abstracts*.—E.B.

UNITED STATES Department of Agriculture. Agricultural Research Administration. R.A.S. 108 (P) **Hybrid seed produces three quarters of a billion bushels more corn annually.** 1948. pp. 2. [Mimeographed.] **831**

Conservative estimates indicate that hybrid seed has increased corn production on the average at least 25 per cent. New corn hybrids are being produced to fit areas in the United States not yet planted with hybrid seed, and better yielding hybrids with greater disease and insect resistance are being developed for areas where hybrid corn is now being grown.

The successful establishment of the production of hybrid corn involves three essential and continuing operations: (1) The isolation of desirable inbred strains that breed true; (2) the determination of which strains, when used in crosses, give the most vigorous and most productive plants; (3) the production and distribution for general planting of seed of the most productive hybrids. These operations are functioning well but they require the continued co-operation of field investigators of genetics, and corn breeding together with the farmer-producers.—K.O.

UNITED STATES Department of Agriculture. Agricultural Research Administration R.A.S. 114 (0). **USDA-34. A sweet corn for the tropics.** 1948. pp. 2. [Mimeographed.] **832**

The report describes the breeding and selection work, carried on since 1920 at the Federal Experiment Station, Puerto Rico, which has resulted in the growing of two superior varieties of sweet corn —USDA-32 and USDA-34. Comparative tests proved the latter to be higher yielding and to have larger ears and kernels. It is a vigorous, tall-growing variety, averaging 8 or 9 ft. in height and slightly resembles the tropical varieties of field corn. Since its first distribution to growers in 1934, USDA-34 sweet corn has been grown in nearly every tropical area in the world. It was particularly valuable in World War II as a fresh vegetable for troops stationed in the Tropics. See also *Plant Breeding Abstracts*.—K.O.

ANDRES, J. M. Híbridos comerciales de maíz. Resultados de las experiencias realizadas durante los años agrícolas 1941-42 a 1947-48. [**Commercial maize hybrids. Results of trials made from 1941-42 to 1947-48.**] *Rev. argent. Agron.* **15.** 236-44. [English summary, 244.] 1948. [Inst. Genet., Fac. Agron. Vet. Univ. Buenos Aires.] **833**

Good yield and drought resistance have been obtained through breeding. The ten best hybrids give a yield on an average 73 per cent greater than that of the controls. Of the 88 hybrids tested, 69 were of semi-dent type, 7 dent and 12 flint. The average yields obtained were 154.78, 145.14 and 135.59 respectively, 100 being the yield of the best controls. Reproduction is in progress; but no seed of the hybrids is yet available for extensive planting.—From author's summary.

BURTON, G. W. **The performance of various mixtures of hybrid and parent inbred pearl millet,** *Pennisetum glaucum* (**L.**) **R.BR.**[1]. *J. Amer. Soc. Agron.* **40.** 908-15. 1948. [Georgia Agric. Exp. Sta.] **834**

Mixtures of parent and hybrid pearl millet seed containing 90, 80, 50 and 20 per cent of hybrid seed, also pure seed of the parents and hybrids, were planted in a latin square yield test at the standard rate of 4 seeds per inch of row. The 6-year average forage production of the 90, 80 and 50 per cent hybrid mixtures did not differ significantly, from that of the pure hybrid, suggesting that over a period any seed mixture within this range will yield as much as pure hybrid seed. The stand of plants was an important factor; with seed rates giving up to 2 plants per inch of row, yields corresponded to yield performance of the components. The standard seed rate giving 3 to 3.5 seedlings per inch of row gave a yield performance from the mixtures comparable to that of pure hybrid seed.—K.J.S.

EIKELAND, H. J. Forsøk med havresortar. [**Trials with oat varieties (in Norway).**] *Meld. Statens Forsøksgård på Voll.* 1944-5. 33rd and 34th working years, pp. 54-5. 1948. **835**

On the oat cultivation borderline in mountain districts, Nidar II is the only variety which can be recommended at present. Among early varieties Perle is suitable for lower lying mountain districts, particularly in inland regions. Ymer and Perle can be grown in coastal districts. In many places in the level country in Trøndelag and in Møre and Romsdal medium-early varieties should be grown.

The first choice should be the variety Strindhavre, particularly on clay soil and with good growing conditions on the whole. Kytø can be used in coastal areas and on particularly damp and nutrient-rich mould and marsh. If an extremely stiff-strawed variety is required, Hirdhavre may be grown. The new variety Trond is a particularly high yielding quality oat, but is not sufficiently stiff in the straw. Bambu is slightly earlier than the others, is of good quality and has stiff straw. On the whole it appears to be a promising variety, but has not yet been sufficiently tested. Of medium-late varieties Golden Rain II can be recommended for cultivation in the warmest and best grain growing districts in the experimental area. Ordinary Golden Rain should no longer be cultivated. Instead Golden Rain II or one of the best medium-late varieties, for example, Strindhavre, should be chosen.—R.P.J.

TIDSKRIFT FÖR LANTMÄN. Tre nya förädlingar. [**Three new bred varieties.**] *Tidskr. Lantm.* **31.** p. 7. 1949. **836**

Tammisto Plant Breeding Institute has bred new varieties of plants which have now come on the market. They include the already partially known Sisu oat. This oat is the result of a cross between Vasa oat and the Tammisto line 02272. Its outstanding advantages are high yield, stiff straw and resistance to drought. Owing to its earliness it is particularly valuable for cultivation even in the north of Finland.—R.P.J.

OKLAHOMA Agricultural Experiment Station. Tech. Bull. No. T-33. **Oat variety and cultural tests in Oklahoma 1925-1947.** By *A. M. Schlehuber*, *W. M. Osborn* and *T. H. Johnston.* 1948. pp. 39. **837**

This bulletin summarizes the oat varietal testing work conducted at Stillwater and Lawton during the period 1925-1947. Data are presented on grain yield, test weight, lodging, maturity, winterhardiness and other characters of importance in varietal adaption. Statements are made and data presented regarding production practices. In addition, descriptions of the common and important oat varieties are included.

On the basis of tests conducted to date, the following varieties are recommended for Oklahoma: For autumn sowing—Wintok, Tennex, Forkedeer, Traveler and Stanton Strain 1 (listed in order of winterhardiness). For spring sowing—Kanota Neosho, New Nortex and Red Rustproof (Texas Red) (listed alphabetically). Fultex is recommended for early spring seeding in south-western Oklahoma. In a comparison of autumn- and spring-sown oats, it was shown that autumn-sown oats produce considerably more grain.—Authors' summary.

FAJERSSON, F. De nya vårvetesorterna i belysning av officiella försök. [**The new spring wheat varieties in the light of official trials.**] *Weibulls ill. Arsb.* **44.** 9-14. 1949. **838**

The official results of tests of Kärn II together with the two Svalöf varieties Diamant II and Progress are presented in tabular form. Kärn II proved superior to Diamant II in grain yield in practically every province where about the same number of trials were carried out. Only in the province of Kronoberg did Diamant II always vindicate its position. In the comparison between Kärn II and Progress, Kärn II shows to even better advantage. If the comparison is extended to cover the whole country Kärn II lies 5 per cent above Diamant II and nearly 8 per cent above Progress. Thus Kärn II is to be preferred to the other two varieties for cultivation in practically all the spring wheat growing areas of importance in Sweden. Exceptions are found in certain parts of the Småland uplands and the more northerly parts of the country, where Diamant has proved to be more reliable in ripening than Kärn II.

Where Brons has been compared with Progress, it has been found that it has everywhere, when the number of trials has been fairly large, been decidedly superior to that variety. On the average of the whole country, Brons lies 5 per cent above Diamant II and between 5 and 6 per cent above Progress. What has been stated about Kärn II applies also to Brons ; it is only in the Småland uplands that Diamant II has given a better yield. The choice of a spring wheat variety can thus in most places of the country be restricted to Brons or Kärn II. Hitherto Brons has vindicated its position as the highest yielding variety in east Sweden while Kärn II has given approximately the same yield as Brons in the other parts of the country. Where the two varieties have been equal in yield, it has been considered that Kärn II should be the first choice owing to its excellent baking qualities. Occasionally the slightly stiffer straw of Brons has been the deciding factor. Kärn II has a considerably larger kernel than Brons. The rate of seeding of the former variety should therefore be higher than of the latter. At Weibullsholm the rates of seeding employed are 200 kg. per ha. with a 1000-grain weight of 40 grm., 175 kg. per ha. with a 1000-grain weight of 35 grm. and so on. This postulates a weed-free soil and a not too niggardly nitrogenous manuring.—R.P.J.

FAJERSSON, F. Höstvetesorter för södra och mellersta Sverige. [**Autumn wheat varieties for south and middle Sweden.**] *Weibulls ill. Årsb.* **44.** 15-19. 1949. **839**

Ergo II is a new variety which has been recently placed on the market: it is a line from Ergo. It has been tested in the official trials since

1945. In the official testing in 1947 Ergo II surpassed Ergo in grain yield by 2.3 per cent on the average of 29 trials. Ergo and Ergo II are approximately equal in winterhardiness, time of ripening and stiffness of straw. For south Sweden Eroica is the variety to be grown on all the good soils in the lowlands. Hansa and Standard II are suitable for low rainfall areas and poorer soils. Eroica's area of cultivation should include Gotland. For the south Swedish uplands Ergo II and where great hardiness is required Virtus are of interest. Aros, which came on the market in the autumn of 1947, has given particularly good results in the provinces of Uppsala and Södermanland. In 1947 in 7 trials in the province of Uppsala, Aros overwintered much better than Ergo: it is only slightly susceptible to attack by the wheat midge, which is of particular importance for that province. In the province of Stockholm in 53 trials during the period 1938-47, Aros gave a 1.6 per cent higher yield than Ergo. The new variety Ergo II and Aros have been about equal in tests up to the present. In the province of Södermanland, Ergo and Aros have been tested together in 59 trials during the period 1941-47. Aros has proved superior to Ergo by 5.6 per cent on the average. Here as in the province of Stockholm Virtus is a supplementary variety to be used for regions with particularly severe climate.

In the province of Ostergötland Eroica is the principal variety for the good wheat soils. It surpassed Borg by 10.7 per cent in 24 trials carried out during the period 1944-47. Its superiority in relation to Ergo and Aros is of the same order of magnitude. On the slightly poorer wheat soils in the lowlands Aros is probably preferable to the new Ergo II. In the parts of the province where an extremely hardy variety with high yield is desired and where a slightly weak straw is not a drawback Virtus should be chosen: it is the highest yielding and most hardy of the varieties available for the particularly severe climatic zones of Sweden.

In the interior of middle Sweden, Aros has not vindicated its position particularly well compared with Ergo.

In west Sweden Aros has never succeeded in surpassing Ergo, although Aros has given good results there. It may be assumed that the new Ergo II will replace Ergo in the typical Ergo-districts of these areas. In the provinces of Göteborg and Bohus, Virtus is recommended for exposed situations, but in the provinces of Skaraborg and Älvsborg certain reservations must be made in view of the risk of lodging. For the good soils in the area, Eroica is the predominant variety. In these tracts Eroica as a rule came through the severe winter 1946-47 better than the middle Swedish varieties.

For the more northerly areas of middle Sweden, Ergo can be counted as an important variety for comparatively good soils and climatic conditions in the provinces of Värmland and Kopparberg, while the preference is to be given to Aros under corresponding conditions in the province of Gävleborg. In large parts of these tracts where severe overwintering conditions have to be reckoned with regularly, Virtus is the variety which gives the highest and most reliable yield.—R.P.J.

Zanini, E., and Ballatore, G. P. Varietà e razze di grano più diffuse in Sicilia. [**Wheat varieties and races most cultivated in Sicily.**] [Reprint from] *Humus, Milan* **4**. No. 10. pp. 3. 1948. **840**

Pre-war wheat production in Sicily was about 7 million q. obtained from 700,000 ha., an amount insufficient to meet the requirement of the island. In reviewing recent works on Sicilian wheat, it is reported that the most complete and up to date is "Frumenti Siciliani" (1942) by U. de Cillis, former director of the Catania Experimental Station of wheat cultivation for Sicily. This author gives 34 varieties of *Triticum durum*, 7 of *T. turgidum*, 3 of *T. vulgare* and 1 of *T. compactum*. In the hot, arid but inconstant environment of the island, rich in violet and ultra-violet radiations, hard wheat is the most suitable and the varieties of wider cultivation are: "Russello S.G.7" selected by de Cillis, and "Senatore Cappelli" and "Garigliano" selected by Strampelli. Information on other cultivated varieties is also given. The authors stress the importance of continuing the work of selection, mainly in regard to earliness.—E.B.

Oliva, A. La granicoltura montana verso la sperimentazione collegiale. [**Wheat cultivation on the mountains towards a joint experimentation.** *Humus, Milan* **5.** 8-11. 1949. [Inst. Agron. Florence Univ.] **841**

Some results of joint field trials on soils of different constitution, situated in different places of the Alps and Apennines, are summarized, and preliminary conclusions drawn. Wheat varieties late rising and resistant to frost, wind, lodging and rust are required for cultivation on the mountains. The cold resistance character is correlative to the creeping behaviour during winter. The variety "Est Mottin" is the most adaptable to this environment; in good conditions of temperature and manuring the "Mont Calme 245" is the higher yielding and "Andriolo 36/14" is the variety that can be grown at the higher altitudes. Yields of 14 to 15 q. per ha. are usual with the best varieties while on soils of good fertility 18 to 24 q. per ha. are obtained.—E.B.

Josa, G. L'intenerimento del grano duro "Cappelli." [**Softening of the hard wheat "Cappelli."**] *Ital. agric.* **85.** 138-43. 1948. **842**

Triticum durum var. "Cappelli" (selected in 1915 by N. Strampelli from an African type) is the most widely cultivated wheat in South Italy, where it has replaced the old local varieties. It is resistant to lodging and rust, and is high yielding, but is susceptible to premature ripening and to softening. The latter alteration consists in the tendency of the grain to store starch rather than proteins. In certain cases the percentage of yellow berries is so high that the wheat is commercially treated as a soft wheat and is used for baking instead of for the confection of " macaroni." Softening is generally considered a non-hereditary character and, in smaller degree, is common to all hard wheat varieties. High temperature and low moisture, mainly during ripening, is favourable to gluten formation in hard wheat, that in Italy has its upper limit of cultivation around the latitude 42° north. Under opposite conditions there is the tendency to starch formation. It is considered that new varieties, resistant to softening, should be selected. In the meantime advice in order to prevent softening is given: " Cappelli " should not be grown above a certain altitude; clayish, dry, well-worked and manured soils, exposed to the south, should be used for preference. Especially nitrogen manuring is useful. It is thought that in non-suitable environment Cappelli is softened to a great extent in 5 to 7 years.—E.B.

HOCKLEY, S. R. **Glenwari: A new rust-resistant wheat.** *J. Dep. Agric. S. Aust.* **52.** 173. 1948. **843**

Glenwari was produced as a result of rigid selection from the outstanding strains Nabawa × (Riverina × Hope). It is a mid-season wheat of medium height, with well standing straw. The grain is medium sized, weighs well, and threshes out readily but does not shatter. It is resistant to flag smut and leaf rust and although a late infection of stem rust may occur in severe epidemics the yield of grain is unaffected. Tests, however, show that the inherent baking quality of Glenwari is inferior to that of Warigo, another rust resistant variety.—K.O.

RICH, A. E., and ODLAND, T. E. **Fertilizer placement for silage corn.** *Proc. Soil Sci. Soc. Amer.* **12.** 253-4. 1947. [Rhode Island A.E.S., Kingston, R.I.] **844**

Eight different methods of applying the same amount and kind of fertilizer to silage corn were compared in relation to their effect on corn yield. Each treatment was replicated four times, the trial being conducted over the three years, 1944-46. Broadcasting before ploughing and the usual band application gave the best results, being superior to the inefficient " plowpole " and other deep placement methods of application.—T.D.H.

REECH, S. D. **Increasing corn yields in Union Parish, La.** *Better Crops with Plant Food* **32.** 12-14 and 41. 1948. [County Agric. Agent, Farmerville, Louisiana] **845**

In demonstrations of Louisiana hybrids (consisting of 70 per cent of the maize grown in Union Parish) in 1946 and 1947, hybrid corn yielded on the average 38.7 bu. per acre against 15.6 bu. for open-pollinated corn, or an average increase of 23.1 bu. per acre. In fertilizer demonstrations on the same Louisiana hybrids, the average yield from well-balanced manuring supplemented by N top dressings was 52.9 bu. per acre as compared with 28.2 bu. on normally manured land, an average increase of 24.6 bu. per acre. The Louisiana hybrids used were white strains No. 468 and 518 and Dixie No. 11. Yellow strains were No. 731 and Funk's G.714.—K.J.S.

HAMMONS, J. G. **The efficiency of anhydrous ammonia as a source of nitrogen on fall planted oats for forage and grain production.** *Proc. Soil Sci. Soc. Amer.* **12.** 266-9. 1947. [Dept. Agron., Mississippi A.E.S.] **846**

Anhydrous ammonia is the cheapest source of fertilizer nitrogen available and this paper is an attempt to determine its relative efficiency compared with ammonium nitrate for the production of forage oats in the autumn and winter and grain oats in the spring. Three different soil types utilized in the experiment were Ora very fine sandy loam, Prentiss fine sandy loam and Savannah fine sandy loam. The treatments were paired and replicated four times. Both fertilizers were equally effective for forage production on the Ora and Prentiss soils, but the ammonia was superior on the Savannah soil. The forage yield was found to be almost directly proportional to the amount of nitrogen applied. On the Ora soil where a good forage yield was obtained, autumn-applied nitrogen did not influence the grain yields. Where 32 lb. of nitrogen were applied in the spring, a good grain yield was obtained and clipping had little influence on the yield. The ammonium nitrate treated plots gave a superior grain yield to the anhydrous ammonia-treated plots. Apparently the greater part of grain yield reduction usually attributed to grazing is due to the removal of nitrogen in the forage.—T.D.H.

HARRIS, H. C. **Copper deficiency in relation to the nutrition of oats.** *Proc. Soil Sci. Soc. Amer.* **12.** 278-81. 1947. [Dept. Agron., Florida A.E.S., Gainesville, Fla] **847**

Unusual symptoms found in oats are apparently due to copper deficiency. The only fertilizer applications that corrected the trouble and produced significant yield increases were those supplying copper. Higher nitrogen applications were found to accentuate the abnormality. The author believes that basic fertilizer treatment, and the minor elements, particularly copper, decreased cold damage in oats. When applied to the soil copper has a considerable residual effect, 2 lb. of copper chloride per acre being effective after 3 years, and 30 lb. of copper sulphate per acre after 5 years.—T.D.H.

TONINI, G. Le nitratature invernali. [**Winter nitrogen manuring.**] *Ital. agric.* **85.** 239-42. 1948. **848**

See *Soils and Fertilizers.*

SMITH, F. W. **The effect of time, rate and method of application of fertilizer on the yield and quality of hard red winter wheat.** *Proc. Soil Sci. Soc. Amer.* **12.** 262-5. 1947. [Dept. Agron., Kansas A.E.S., Manhattan] **849**

Trials using different fertilizer rates, in different combinations (of N and P_2O_5) and with different methods of application were carried out, each treatment being replicated four times. The effect of the treatments on wheat yield, wheat test weight, protein content and protein yield per acre was noted. Yield increases from the use of N or P_2O_5 alone were not significant, but an application of nitrogen at the rate of 25 lb. per acre produced a decrease in yield. Significant yield increases resulted when P_2O_5 was applied at the rate of 25 lb. per acre at seeding time together with a spring top-dressing providing 25 lb. of N per acre. Similar increases resulted when 25 lb. of N, 25 lb. of P_2O_5 plus 25 lb. of K per acre were applied with the seed; when 25 lb. of N and P_2O_5 were applied at seeding time; and when 50 lbs. per acre each of N and P_2O_5 were applied on the plowsole. None of the treatments produced a significant increase in the test weight, the application of 100 lb. per acre of N, either at seeding time or as a spring top-dressing produced a significant lowering of the test weight. There were no significant differences in either protein content or in protein yield per acre.—T.D.H.

EDINBURGH and East of Scotland College of Agriculture. Bull. No. 1. **Economic aspects of farm mechanisation. Combine harvesters in East and South-East Scotland 1945.** 1946. pp. 44. **850**

Consequent on the increasing use, especially South of the Forth of combine harvesters, records of 95 machines were kept and revealed the heavy capital outlay for the short average season of five weeks use and the high running costs due to the low acreage combined and the high depreciation costs. On average each combine harvested 151 acres of grain—a lower average than in England,—and was only used for 50 per cent of the total grain acreage on the sample farms, and 5.5 per cent of all the grain acreage. Barley was the most favoured crop for combining, wheat and oats (because of the value of the straw) the least favoured. One farmer used a combine for harvesting grass seed. The use of the combine appeared potentially valuable but emphasis is laid on the necessity for consideration of the economical use of time and labour, the development of grain drying and bulk storage, and the solution of the equally important problem of straw disposal.—A.D.H.

VINTER, R. A. **Storage drying of grain.** *J. Min. Agric.* **55.** 488-9. 1949. **851**

Experiments with the type of grain drier which uses forced air for ventilation and drying, and saves the grain from excessive heat, have produced the "storage grain drier" described and illustrated in this article. A temperature rise of 14°F above that of the ingoing air is sufficient to dry the corn. The drying towers each hold 20 tons of grain and are in four sections—the bottom section made of expanded metal covered with asbestos, the second—of aluminium panels, the third—of sheet steel, and the top floor of beaver board. A portable pneumatic grain elevator is used for filling the towers. A check on the moisture content of the grain after 4 days is required and it is advisable to circulate the grain though it is not necessary to have an operator on the site all the time. The average cost of drying, including the use of the portable unit for filling the towers is approximately 18 to 20 shillings per ton of grain dried.—K.O.

BAN, P. A. v.d. Drooginrichtingen en reinigingsmachines voor brouwgerst. [**Drying installations and cleaning equipment for malting barley.**] *Jaarb. nat. Com. Brouwgerst* **11.** 34-40. [English summary.] 1947. **852**

Various types of drying and cleaning equipment are described. It is especially desirable not to expose malting barley to too high a temperature lest the percentage of germinating grains be reduced.—G.M.R.

GASTEL, J. J. van. Oogstmethoden voor brouwgerst. **Harvest methods for malting barley.** *Jaarb. nat. Com. Brouwgerst.* **11.** 48-51. [English summary] 1947. [Barendrecht] **853**

The moisture content of malting barley should not exceed 16.5 per cent, but it is often difficult to attain this standard in the Netherlands because August, the harvest month, is one of the rainiest times of the year and moisture content is incurred chiefly during the harvest season while the grain is still in the straw. One way of meeting the difficulty is through early sowing, say, in the first 14 days of March, so that harvesting can be done about July 20th. to 25th. and the rainy season avoided. The effect on moisture content of the time at which the crop is mown and of harvest technique and threshing respectively is discussed. The present trend of opinion is towards the use of combines, which necessitates, however, somewhat earlier mowing and subsequent drying of the grain.

The technique of drying still requires study and improvement.—G.M.R.

PRUMMEL, B. Oogsten en drogen van granen in den Noordoostpolder. **Harvesting and drying of grain in the North-east Polder.** *Jaarb. nat. Com. Brouwgerst* **11.** 41-7. [English summary] 1947. [Inspector North-east Polder, Kampen, Netherlands] **854**

Some 13,750 hectares of this newly reclaimed land are occupied by cereals. Harvesting is done by 140 tractor-drawn binders. Trials of three combines, a 12-foot Massey Harris, an 8-foot Moline and a 6-foot Bolinder Munktells, were made in 1947. If successful use can be made of combines, a considerable reduction of costs will be effected.—G.M.R.

BECKER, W. R. De mechanisatie en de toekomstmogelijkheden van de maïsteelt in Nederland. [**The mechanization and future prospects of maize growing in the Netherlands.**] *Maandbl. LandbVoorlDnst.* **6.** 50-3. 1949. [Cent. Inst. Agric. Res., Wageningen] **855**

Practically no maize was grown in the Netherlands before 1934, but the area had increased to approximately 4700 ha. in 1948 in spite of difficulties such as the labour involved in harvesting, the problem of dry storage, and damage by birds. Labour-saving machines used in the U.S.A. are described and those available in the Netherlands listed. Of all mechanical devices the harvester is the most important for making maize-growing profitable; a single-row mechanical harvester reduces labour to 10 per cent that required for hand harvesting. Co-operative ownership would solve problems of cost. In a 10-year trial of rye and maize at Heinio the average yield of rye, in kg. per ha., was 3060 and that of maize 4270. For the light lands of the Netherlands maize is the most productive fodder cereal; it might replace potatoes in some places where the latter crop has been unsuccessful; it might also be grown for industrial purposes; and the breeding of hybrids adapted to regional conditions would open up further prospects.—G.M.R.

VELDHUIZEN, H. van. De Brouwgersttentoonstelling 1946 en de kwaliteit van de Nederlandse brouwgerst oogst 1946. [**The Malting Barley Show and the quality of the Dutch malting barley harvested in 1946.**] *Jaarb. nat. Com. Brouwgerst* **12.** 9-22. 1948. **856**

In consequence of unusually wet, bad weather in August 1946, the quality of the Netherlands malting barley crop of that year was the poorest within the experience of the National Committee for Malting Barley. Moisture content was even for Dutch barley unusually high and some 1 per cent higher than the mean for the previous 8 years; germination capacity 1.5 per cent lower than the mean for the previous 8 years. Protein content was on the whole normal: in the Abed Kenia samples exhibited it was on an average 10.3 per cent; in the Saxonia barley grown in the inundated regions of Walcheren it was higher, namely, 12.8 per cent, and in one sample as much as 17.5 per cent. Not enough care had been given to cleaning.—G.M.R.

GANGSTAD, E. O., and SNELL, R. S. **A practical method for quantitative evaluation of texture in sweet corn inbreds and hybrids.** *J. Amer. Soc. Agron.* **40.** 885-93. 1948. [New Jersey Agric. Exp. Sta.] **857**

The texture is measured in terms of tenderness or resistance of the kernel to mechanical puncture. Experimental data of puncture resistance are recorded for inbreds and hybrids at 10, 14, 17, 20 and 24 days after pollination. The regression equation of puncture metre readings on the product of dry weight and days after pollination affords a practical method for quantitative evaluation of the genetic inheritance of texture of sweet corn inbreds and hybrids. The data indicate that the tenderness of hybrids may be predicted by simultaneous solution of the regression equations of the inbreds.—K.J.S.

PEREIRA, A. Proteínas do trigo. II. Sua variação e correlação com produção e pêso do hectólitro. [**Wheat proteins. II. Their variation and correlation with productivity and hectolitre weight.**] *Agron. lusit.* **8.** 131-46. [English summary, 145.] 1946. [Received 1949] [Est. Agron. Nac., Sacavém, Portugal] **858**

Five wheat varieties were grown in different parts of Portugal and changes in protein content as governed by variety and locality were observed. Variations due to local environment were greater than varietal variations. Gliadin and glutenin were most subject to change. A highly significant multiple correlation between protein and production and hectolitre weight was determined, and a highly significant correlation between protein and gluten.—From author's summary.

SOUTH AFRICA Department of Agriculture and Forestry. Bull. 253. **Kernel characteristics of the bread-wheat varieties grown in South Africa.** By *J. T. R. Sim, P. D. Henning* and *C. B. Henning.* 1945. pp. 64. **859**

The following distinguishing characters of the wheat kernel are defined, with illustrations—colour, size, shape, the germ and embryo, shoulder, back, base, brush, cheeks, crease, skin and outer glumes. The kernel characters of some 56 wheat varieties now grown in the Union are described; the subject is important in view of the wheat-grading system of the Wheat Industry Control Board by which wheat is classed into (A) bread wheats of good baking quality ; (B) bread wheats other than those under A ; (D) varieties belonging to the durum group.—K.J.S.

Woestmann, B. S. J. Onderzoekingen over het eiwitcomplex in *Triticum vulgare.* [**Studies of the protein complex in** *Triticum vulgare.*] Diss. Amsterdam, 1948. **860**

Reducing compounds have a bad effect upon the quality of bread and some oxidizing substances are used to improve bread. The deterioration in bread is caused by weak cohesion in the protein, which again can be the consequence of partial disintegration through proteinases or of reduction of the sulphur bonds in the protein. The favourable action of oxidizing agents appears to rest on a conversion of the HS-SH bond into an S=S bond. There appears to be a good correlation between the number of S=S bonds and baking quality as expressed in the extensogram. The relation between the number of HS-SH and S=S bonds, together with the influence of oxidizing agents, was determined by measuring the redox potential with a drip mercury electrode. From *Landbouwk. Tijdschr.* 61. 66-7. 1949.—G.M.R.

Kellenbarger, Shirley and Swenson, S. P. **Pearling index and wheat meal fermentation time in two winter wheat crosses.** *J. Amer. Soc. Agron.* **40.** 929-39. 1948. [Washington Agric. Exp. Sta.] **861**

The winter wheat crosses Rex × No Name and Brevon × No Name were studied to segregate for pearling index and fermentation time. It would appear that the two characters may be weakly associated but that for practical purposes they can be considered as being independently inherited. Three main genes appear to be conditioning segregation for pearling index in the Rex × No Name cross, and one main gene with an additional modifier in the Brevon × No-Name cross. Two main genes appear to differentiate fermentation time in the Rex × No-Name cross and three main genes in the Brevon × No-Name cross.—K.J.S.

Lee, J. W., and Underwood, E. J. **The total phosphorus, phytate phosphorus and inorganic phosphorus content of wheat, and its mill products.** *Aust. J. exp. Biol. med. Sci.* **26.** 413-8. 1948. [Univ. of West Australia] **862**

Samples from 4 mills taken at 3 different dates in 1947 were examined. Total phosphorus content of West Australian wheats are confirmed to be considerably lower (av. 0.26 per cent on dry basis) than that of Great Britain (av. 0.43 per cent) and of U.S.A. (av. 0.43 per cent). The levels of phytic acid phosphorus are correspondingly low. The mean proportion of total P present as phytic acid P was 67.1 per cent for the wheat ; for bran, pollard and flour (72 per cent extraction) phytic acid P represented 82.4, 70.4 and 29.4 per cent of total P respectively. Inorganic P determined on one set of samples from each mill was : wheat 0.012, bran 0.039, pollard 0.025 and flour 0.004 per cent of the dry matter (about 4.5 per cent of the total P).

It is not known whether these low P levels are common to all Australian wheats.—K.J.S.

Clare, L. E. A. and Underwood, E. J. **The thiamin and riboflavin contents of wheat and its mill products.** *Aust. J. exp. Biol. med. Sci.* **26.** 419-23. **863**

Samples of wheat, flour, bran and pollard from 4 West Australian mills were assayed for thiamine (thichime method of Slater) and riboflavin (fluorimetric method of Slater and Morell). Extraction percentages (Morell method) were 71.5, 15.25 and 13.25 per cent for the flour, bran and pollard respectively. In the four wheats, flours, brans and pollards, thiamine averaged 3.72, 1.35, 6.6 and 13.2 μg. per grm ; riboflavin averaged 0.76, 0.29, 2.34 and 1.34 μg per grm respectively, expressed on air-dry basis. The flour retained about 26 per cent of the total thiamine and 27.3 per cent of the riboflavin.—K.J.S.

Oliveira, A. J. de. Estudos de estatística agronómica. I. Teste de significância das diferenças entre coeficientes parciais da regressão entre proteína e glúten de trigos cultivados em várias localidades. [**Statistical studies. I. Test of significance of the differences between partial coefficients of regression in the variables protein and gluten of wheats grown in different places.**] *Agron. lusit.* **8.** 73-88. [English summary, 86.] 1946. [Received 1949.] **864**

A test of significance of the differences between partial coefficients of regression derived from two sets of correlated dependent and independent varieties as explained by Yates (*Proc. roy. Soc. Edin.* 59. 184-94, 1939) is briefly discussed and illustrated by the variables protein and gluten of five varieties of wheat cultivated in nine places in Portugal during 1943 and 1944.

There are no significant differences between the partial coefficients of regression. Five straight lines were fitted and a test of significance was applied. Four of the varieties of wheat : Mocho de Espiga Branca, Quaderna, Galego Rapado and Rietti, have the same coefficient of linear regression. For data of Argelino wheat a logarithmic curve of type log Y = a + bX was tested, because it proved to be a good fit.

A design of greater comprehensiveness replicated for 2 to 3 years is proposed.—Author's summary.

Oliveira, A. J. de. Estudos de estatística agronómica. II. Regressáo múltipla da proteína com e produção e o peso do hectolitro de trigos cultivados em diversas localidades. [**Statistical studies. II. Multiple regression of the protein with production and hectolitre weight in wheats grown in different localities.**] *Agron. lusit.* **8.** 147-59. [English summary, 158-9.] 1946. [Received 1949] [Est. Agron. Nac., Sacavém, Portugal] **865**

The advantageous technique of the analysis of covariance is briefly described and exemplified in the multiple regression between yield and hectolitre weight and protein in five wheat varieties cultivated in different localities during 1934-44.

The multiple linear correlation coefficient $R = 0.50468$ is highly significant. By the regression equation $Y = 34.7349 - - 0.0064 X_1 - 0.2642 X_2$, which relates the variables independently of localities and varieties, a three-dimension diagram is prepared. Tests of significance and standard errors for adjusted means of protein are worked out. —Author's summary.

Leeds University Department of Agriculture. Economics Section. Fmrs' Rep. No. 80. **Costs of growing spring oats in two districts of Yorkshire, 1947.** By *W. H. Long.* 1948. pp. 11. [Mimeographed.] **866**

The two selected areas were in the Wold district where normal arable rotation was practised, and in the West Riding where the crop was grown to provide corn for the stock chiefly kept for milk production. Costs per acre were lower on the larger farms in the Wold district, and yields were higher, though the amount of seed sown per acre was less than on the smaller average acreage farms of West Riding. More tractor labour was used in the Wold district, particularly for cultivations, and more horse labour was employed in the West Riding. Of the total production costs of £10 17s. 7d. per acre on the Wold farms, and £12 15s. 11d. farms in the other group, total labour costs averaged £4 11s. 6d. and £5 15s. 0d. respectively.

Less labour was used than in 1946, possibly due to the light crop, and the favourable harvesting weather, coupled with the short time available for spring cultivations. There seemed considerable flexibility in the rotation followed, and very little uniformity in manuring.—A.D.H.

Leeds University Department of Agriculture. Economics Section. Fmrs' Rep. No. 79. **Costs of growing wheat on some Holderness Farms in 1947.** By *W. H. Long.* 1948. pp. 15. [Mimeographed.] **867**

Using the survey method, the average cost of raising wheat on 21 farms of moderate size situated on some of the heavier land in the Holderness district of Yorkshire was assessed at £12 an acre. Of this £2 represented the net cost of unexhausted manurial and cultivation residues, and fifteen shillings the charge for overheads; seed, manures and rent account for a further £4 and the labour costs for the remaining charges. Of the thirty man hours employed on average per acre, one-third was used before harvest, and two-thirds for harvest and threshing, but of the average eight and a half hours horse labour and the six hours tractor labour used per acre twice as much was needed before harvest as during harvest operations. A significant saving in man labour was made by using tractor power instead of horses before harvest, but at harvest time the saving was insignificant.

Yields per acre averaged 17.25 cwt. of head corn and 1 cwt. of tail, and the surplus of returns over expenses averaged £7 11s. 11d. per acre and 8s. 8d. per cwt.

Compared with the survey made in 1945, costs had risen, for though man hours had decreased tractor hours had increased, and there had been an increase in wage rates. Neither crop failures, nor the dry weather during the 1947 harvest which reduced harvest costs was taken into consideration in this respect.—A.D.H.

Franck, W. J. Nieuwe gezichtspunten op het gebied van de kieming van gerst. **New points of view concerning the germination of barley.** *Jaarb. nat. Com. Brouwgerst* **12.** 29-34. [English summary] [Director, Govt. Seed Testing Sta., Wageningen, Netherlands] **868**

Seed treatment with hormones yielded contradictory results. The influence of inhibitors originating during germination is, however, accepted by the author as an established fact. By soaking barley in flowing water it is possible to eliminate the inhibitors completely. The retardation due to insufficient maturity of the germ may be removed by means of low temperatures.—Author's summary.

Kakebeeke, W. Kan de warmwaterbehandeling van zaaigerst verbeterd worden ? **Can the hot-water seed treatment of barley be improved?** *Jaarb. nat. Com. Brouwgerst* **12.** 50-5. [English summary] 1948. [Bathpolders, Netherlands] **869**

Because Abed Kenia, a barley variety extensively grown in the Netherlands, is very susceptible to loose smut the supplying of seed encounters serious difficulties. In various respects the hot water treatment can be improved. The author draws attention to the continuous treatment, in which temperatures of 46°C. (i.e. considerably below 52°C.) are used.—Author's summary.

CAVAZZA, L. Ricerche sull'azione stimolante delle urine. [**Researches on the stimulating action of urines.**] *Ann. Fac. Agrar. Bari.* **6.** 203-24. 1948. **870**

The author reviews the literature on the subject. He then refers to trials carried out at the Agronomy Institute of the Bari University which consist in the treatment of wheat, rye, barley and oats seeds, before sowing, with solutions of bovine urine in water at different concentrations. Inhibition, increasing with concentration, has been noted on germinability, mainly on germinating power and also on the first development of the seedling. No evident differences have been noted in the further development of the plant. In regard to production, the treatment is positively effective within certain limits of concentration (generally 10 and 20 per cent is the optimal concentration). The author suggests that further researches may allow to give, particularly to cereal cultivation, a cheap method of increasing production.—E.B.

AGRICULTURA TROPICAL. Como debe escogerse el maíz para semilla. [**How maize for sowing should be selected.**] *Agric. trop.* **4.** No. 11. 15-6 1948. **871**

Taken from a Brazilian journal. Maize grains for sowing should be selected when the cobs are almost ripe for harvesting ; from healthy, erect, low-growing rather than tall plants growing in soil representative in regard to fertility, depth, moisture, etc., of the whole field ; and from plants with two well-developed cobs of equal size, such plants giving on an average 25 per cent more grain than one-cob plants. The cobs should have a firm husk exceeding the length of the cob and so protecting it from fungus spores. Advice is given on storage. —G.M.R.

CHIAPPELLI, R. Diserbanti chimici. Erbe infeste in risaia. [**Chemical herbicides. Weeds in the rice field.**] *G. Agric. Domen.* **59.** 59. 1949. [Vercelli, Exp. Sta. for Rice Cultivation] **872**

In the Italian rice fields up to the present weeding has been carried out by mechanical means or by hand. The author refers to laboratory trials to test a chemical herbicide, Agroxone (produced by the Soc. Solplant of Milan and containing Metaxone) on the most common weeds belonging to the Cyperaceae and Gramineae. *Scirpus mucronatus*, *Alisma plantago*, and *Cyperus difformis* are completely destroyed. Good results have been obtained on *Scirpus marittimus*, while the effect was nil on *Marsilia quadrifolia* and on rice. In field trials, after the soil had been drained, Agroxone employed at the rate of 1000 litres per ha. has destroyed *S. mucronatus* and left rice intact. It is estimated that with the use of this herbicide, much labour and expense can be saved.—E.B.

RIDDLE, O. C., and SUNESON, C. A. **Sources and use of scald resistance in barley.** *J. Amer. Soc. Agron.* **40.** 926-8. 1948. [Univ. California] **873**

Barley scald, *Rhynchosporium secalis* is regarded as the most destructive barley disease in California. Observed field responses of various resistant varieties during 1937-47 are recorded and a backcross breeding programme described. This has resulted in the backcross derived varieties (Turk × Atlas), C.I. 7189 and Atlas 46, C.I. 7323. —K.J.S.

JAMALAINEN, E. A. Viljan peittaus kokeet maatalouskoelaitoksen kasvitautiosastolla vuosina 1943-1946. [**Cereal disinfection trials carried out by the Agricultural Experiment Station, Division for Plant Pathology, (Tikkurila) in the years 1943-1946.**] *Valt. Maatalousk. Tiedon.* No. 213. pp. 13. 1947. **874**

Seeds of spring and autumn cereals were infected with smuts (*Ustilago avenae, Tilletia caries*), *Fusarium nivale*, or *F. graminearum*, and sown in boxes. Germination counts were recorded. Samples of the seed were dressed with about 27 proprietary compounds manufactured in Finland, England, Sweden, Denmark, Germany, Switzerland, and Belgium. The purpose of the tests described was to compare the effectiveness of these compounds. When the sprouts were about 10 cm. long they were planted out in the field. The rate of mortality was recorded during the course of the experiments.

No sure conclusions have yet been reached as regards the autumn cereals, but several of the compounds have proved effective both in autumn and winter. They have sometimes increased the germination counts, and enabled the seedlings more effectively to survive the winter than the seedlings from untreated seed. When, because of bad weather, autumn sowing was late, seed dressing proved to be especially advantageous.—I.Z.

SCHIPSTRA, K. De gele halmvlieg (*Chlorops Pumilionis* Bjerk). [**The gout fly.**] *Maandbl. LandbVoorlDnst* **6.** 153-6. 1949. [Phytopathological Advisory Service, Wageningen, Netherlands] **875**

Chlorops Pumilionis, which attacks cereals and grasses, is as yet uncommon in the Netherlands although in the last 2 years it has done damage in some places. In case it should spread, an illustrated account is given of the life cycle of the insect and of its manner of attack. Early spring sowing of cereals is a preventive measure, as is also the control of *Agropyron repens*, which is an important host of the gout fly. Autumn sowings of wheat and barley should not take place before, say, Oct. 12th., as the pest's autumn attack is made during the first 3 weeks of October, after which there is little risk of injury.—G.M.R.

ZÜRICH-OERLIKON, Eidg. landwirtschaftlichen Versuchsanstalt Flugbl. Nr. 9. Die wichtigsten Brandkrankheiten des Getreides und ihre Bekämpfung. [**The most important smut diseases of cereals and their control.**] 1948. pp. 6. **876**

Smut is caused by the following fungi: *Tilletia tritici*, *Ustilago tritici*, *U. nuda*, *U. hordei* and *U. avenae*. The stage at which the host is infected and the method of controlling the infection are given for each fungus. Infection is either in the seed at germination or in the flower at time of flowering.

Control of smut which enters the seed is accomplished by seed treatment with chemical disinfectants with or without water. When infection takes place during flowering the grain crop is disinfected with hot water (50°C) and dried.—D.B.

ARGENTINA, Ministerio de Agricultura de la Nacion, Instituto de Sanidad Vegetal. Vol. 2. No. 4. Ser. B. El problemá del "Pulgón verde" de los cereales en la Argentina. [**The problem of** *Schizaphis graminum* **in Argentina.**] By *V. L. Cristóbal*. 1946. pp. 24. [Received 1949.] [In charge of the Regional Insectary of M. B. Gonnet] **877**

The aphid *Schizaphis graminum* (Rond.) Blanchard, until 1943 known as *Toxoptera graminum* Rond., was first recorded for Argentina in 1914. It has now become a serious menace to the cereal crops of this and other South American countries. Fourteen active generations of the pest breed within 12 months. Resistance in crops varies with the age of the plants and the humidity of the soil. All cereals are attacked, although oats are the preferred species. The author of this booklet studies the morphology, life cycle and ecology of the insect; the nature of the damage done to plants, in which he describes experiments of his own; the importance of resistant plant varieties; biological control in general and in particular by means of *Aphidius platensis* Brethes, some other insect parasites and a fungus named *Arcostalagmus aphidum*; and chemical and mechanical control. The Argentine area invaded by the pest in 1944 and 1945 is mapped, with an indication of where parasites of the pest are also present.—G.M.R.

LEIBOFF, R. O. Aparición de un parásito poco frecuente del pulgón verde de los cereales en la Pampa Central. [**Appearance of a rare parasite of** *Schyzaphis graminum* **in central La Pampa.**] *Rev. argent. Agron.* **15.** 256-7. 1948. [Nat. Exp. Sta., Guatraché, La Pampa, Argentina] **878**

The parasite recorded, it is believed for the first time in the current literature, is *Eupachyneuron bosqui* Blchd. Its presence, together with that of the more well-known parasite *Aphidius platensis*, probably accounted for the restriction to one locality of an attack of cereal crops by *Schyzaphis graminum* at Guatraché, La Pampa, unusually late in the year.—G.M.R.

HOPPE, P. E. **Differences in** *Pythium* **injury to corn seedlings at high and low soil temperatures.** *Phytopathology* **39.** 77-84. 1949. **879**

Arasan (tetramethyl thiuram disulphide) seed treatment provides an excellent control against stunting of corn seedlings derived from crown wounded seeds grown in warm soil. The stunting in the non-treated controls being due to soil borne *Pythium* species.—T.D.H.

FENNELL, J. L. Maíz resistente al gusano de la raíz. [**Maize resistant to the root grub.**] *Hacienda, New York.* Feb. 1946. p. 1. [Interamer. Inst. Agric. Sci., Turrialba, Costa Rica] **880**

In some parts of Central America, 80 per cent of the total maize crop is destroyed by the ravages of *Diobrotica* spp. Over two hundred maize varieties were tested at Turrialba for resistance to the pest, but without success until seed was obtained of some rare varieties known as "Indian maize" emanating from the remote mountain region of Chirripó, Costa Rica. Chirripó No. 1 was entirely resistant: of 1800 plants tested not one fell prey to the pest, while in the control 60 per cent were destroyed. The variety is described.—G.M.R.

SIBILIA, C. I danni delle ruggini. [**Damages from rusts.**] *Ital. agric.* **85.** 193-6. 1948. **881**

Preliminary trials for the statistical study of damage caused to wheat cultivations by rust (*Puccinia glumarum*, *P. triticina* and *P. graminis*) have been carried out in 1946-47 following Ducomet's method and Fisher's method. The author is of the opinion that Ducomet's method is simple but not exact, and probably is suitable only in the case of serious infections. In applying Fisher's method a certain number of plots sown with wheat were given sulphuric treatments in different number and yields compared. Production appears to be proportional, according to the parabolic law, to the number of treatments. Trials are to be continued.—E.B.

MCKINNEY, H. H. **Wheats immune from soil-borne mosaic viruses in the field, susceptible when inoculated manually.** *Phytopathology.* **38.** 1003-13. 1948. **882**

A continuation of the author's studies of the reaction of wheats to viruses. When grown in virus-infested soils, it appears that the field resistant wheats may be resistant in varying degrees to one or more of the green mosaics and immune, in most cases, from the yellow mosaics. Field immune wheats appear to be immune to both green and yellow mosaics. Results of manual inoculations by the leaf wiping method show that field resistance and field immunity from mosiac in wheats is not reflected in tests where the inoculation is by manual methods. With all the virus collections used in the study the mosaic symptoms were as strong in wheats that are resistant or immune in the field as they were in the susceptible controls. Reasons for this breakdown are discussed. It follows that routine testing and genetic studies on wheat must be on the infested soil except in the case of the rosette reaction which can be studied when inoculation is done manually.—K.J.S.

SCHLEHUBER, A. M. **Widespread occurrence of supernumerary spikelets in common wheat.** *Agron. J.* **41.** 46-7. 1949. [Dept. Agron., Oklahoma Agric. Exp. Sta., Stillwater, Okla] **883**

Oklahoma wheat yields for 1948 were far in excess of those predicted. Apparently the main factor causing this discrepancy was the widespread occurrence of three-seeded and supernumerary spikelets in that year. The probable reason for the occurrence of these abnormal heads, producing over 100 per cent more seed than normal heads, is that the environmental conditions were such as to suppress tillering and stimulate spikelet development. Similar abnormal heads have resulted from 2,4-D treatment.—T.D.H.

GOODALL, D. W. **Studies in the diagnosis of mineral deficiency. IV. The mineral content of barley plants in relation to potassium deficiency.** *Ann. appl. Biol.* **35.** 605-23. 1948. **884**

Previous papers, on the use of analysis in mineral deficiency disease diagnosis are reviewed. Samples of various organs of barley plants were gathered at the time of ear emergence from four different suspected potassium deficient sites and analysed spectrographically, by a modification of Roach's method, for Ca, Fe, Mg, Mn, K and Na. Differences in composition between plants from the different sites were proportionately greater in the older leaf blades than in the other organs for Ca, the young leaves for Mn and Na, and the older leaf blades and sheaths for potassium. Differences in Na and Mn content at the different sites appeared to be related to the differences in potassium status. The proportional increases observed in potassium content as a result of application of muriate of potash were similar at all four sites, despite the fact that responses in growth and yield differed greatly. The responses to muriate of potash observed in the yields of grain are significantly correlated with the potassium content of the older leaf blades and the stem. The following tentative limiting values are put forward, above which no increases in grain yield as a result of potassic manuring may be expected :

(a) in the older leaf blades at the time of ear emergence 0.92 per cent K in dry matter.

(b) in the stems leaf blades at the time of ear emergence 1.01 per cent K in dry matter.

—T.D.H.

RAYNS, F. **Nutrition of cereals.** *Fmg* **2.** 366-70. 1948. [Dir. Norfolk Agric. Sta.] **885**

Failures of cereals due to deficiencies in trace elements, as distinct from failures due to major elements, have been frequently recorded in England, but important as they are, failures of cereals due to trace elements are of much less economic importance in the nutrition of cereals than those due to shortages of the major elements, calcium, phosphorus, potassium, and nitrogen. Characteristics of cereals displaying deficiency symptoms are described and remedial measures are suggested.—J.T.B.

NANCE, J. F. **The role of oxygen in nitrate assimilation by wheat roots.** *Amer. J. Bot.* **35.** 602-6. 1948. [Univ. Illinois, Urbana] **886**

Effects of oxygen on nitrate assimilation, apart from the influence of oxygen on nitrate accumulation, were studied. It was found that oxygen inhibits the assimilation of previously absorbed nitrate in excised wheat seedling roots, and that the inhibition is enhanced by calcium and manganese salts. Oxidative inhibition of nitrate assimilation during the active accumulation of nitrate was not demonstrated at oxygen tensions produced by simple aeration, nor was an inhibition produced under these conditions by addition of manganese. In confirmation of work by Burström, it was found that oxygen actually increases nitrate assimilation in macerated roots. It is suggested that nitrate assimilation normally occurs under conditions which favour aerobic fermentation.—Author's summary.

SIRCAR, S. M., and DE, B. N. **Studies in the physiology of rice. IV. The effect of photoperiodic induction on nitrogen metabolism of winter paddy.** *Proc. Nat. Inst. Sci. India* **14.** 263-70. 1949. **887**

An experiment is described in which seedlings of rice var. Bhasamanik were given short days of 10 hours in the seed bed for 6 weeks and subsequently the seedlings were transplanted in field plots. The controls in seed beds were exposed all through to normal day length.

Analysis of nitrogen fractions of seedlings, leaves and growing apices have revealed that exposure of seedlings to short days in seed beds for 6 weeks modifies the course of nitrogen metabolism of the plants throughout the life history. Absorption of nitrogen and synthesis of protein is markedly increased in the short day plants. With the initiation of flower primordia an accumulation of amino acids takes place in the growing apex.—Authors' summary.

WOOD, J. G., and HONE, M. R. **Studies of the nitrogen metabolism of plants. VIII. Utilization of α-oximinocarboxylic acids by oat plants.** *Aust. J. Sci. Res.*, Series B. **1.** 163-75. 1948. [Bot. Sch., Univ. Adelaide] **888**

Oat plants were grown in culture solutions containing hydroxylamine, oximinopropionic acid, *trans*-oximinosuccinic acid and *cis*- and *trans*-oximinoglutaric acids in different concentrations at pH 7. Morphological changes and nitrogen contents, including protein-N contents, of these plants are described. It is shown that all these oximes can be utilized as a source of nitrogen for protein synthesis; optimum concentrations for protein synthesis in oats is about 1×10^{-5}M for hydroxylamine, 1×10^{-4}M for oximinopropionate and 1×10^{-3}M for the oximino-dicarboxylic acids.

The amount of protein synthesis was small in plants grown in solutions of hydroxylamine and oximinopropionic acid which also caused marked depression in dry weight production, especially in roots. In solutions of oximino-dicarboxylic acids plants were normal and the amount of protein synthesis was relatively large, though less than that in plants grown in nitrate solutions of the same molarity.

The possibility that oximinosuccinate and oximinoglutarate are intermediaries in the formation of proteins from nitrate is briefly discussed.—Authors' summary.

CAVANILLAS, L. Estudios sobre transpiracion vegetal. Experiencias con trigo cultivado en lisímetros. [**Studies on plant transpiration. Trials on wheat grown in lysimeters.**] *An. Inst. esp. Edaf. Ecol. Fisiol veg.* **7.** 187-200. 1948. **889**

Account of seven trials carried out in 1945-46 with summer wheat is given. No definite conclusions are reached and trials are to be continued. Analysis of wheat obtained has been carried out by F. Silvela y de Tordesillas. (See *Fld Crop Abstr.* No. 1. Abstr. 1029).—E.B.

ASANA, R. D., and MANI, V. S. **Photosynthesis in the ears of five varieties of wheat.** *Nature, Lond.* **163.** 450-1. 1949. [Indian Agric. Res. Inst., New Delhi] **890**

In the course of work on physiological analysis of factors determining yield, possible varietal differences have been studied in relation to the contribution made by assimilation in the ear to grain yield in wheat. The technique adopted was similar to that of Watson and Norman (*Herb. Abstr.* 9. Abs. 1503). [N.P.=New Pusa, formerly designated Pusa and Imperial Pusa.] It is concluded that: " (a) assimilation in the ear contributes considerably more to grain yield and total plant weight in N.P. 735 and N.P. 710 than in the other three varieties; (b) the leaf and the ear contribute to total dry weight to the same extent in N.P. 710 and N.P. 735, whereas in the case of the other three varieties the leaf contributes more to the total dry weight; (c) in N.P. 165 the contribution of the leaf to total dry weight was, on the whole, the largest; (d) as a result of shading the ear, the reduction in 1000-grain weight correlated, on the whole, better than reduction in grain number per spikelet with the differences in assimilation in the ear, which indicates that processes connected with seed setting (fertilization, embryo development, etc.) are not specifically affected; in fact, defoliation also affected seed setting.

It was observed in an investigation on the comparative performances of several varieties of wheat that N.P. 710 yielded better than the other three early varieties, N.P. 165, Punjab 9D and Agra Local, under restricted soil moisture. It is a matter of general observation that N.P. 710 and N.P. 735 are fairly resistant to black rust, whereas Agra Local and Punjab 9D are susceptible, and N.P. 165 is only moderately resistant.

It would appear that a variety with ears of high assimilatory capacity would perform relatively better in an adverse environment."—M.H.

BREITENSTEIN, W. Faktorer som inverka på höstsädens övervintring. [**Factors which influence overwintering of autumn sown cereals.**] *Tidskr. Lantm.* **31.** 32-4. 1949. **891**

Nearly 7.5 per cent of Finland's arable area is sown with autumn cereals. The yield from this area is computed at 200 million kg. grain. Overwintering of the crops is influenced by a large number of factors such as cold, frost in the soil, drought and moisture, but through effective drainage, adequate and purposeful manuring, procuring of prime seed grain of an adequately winterhardy variety, choice of correct sowing date and rate of seeding together with careful disinfection and sowing, the crop yield can be considerably increased.—R.P.J.

HASKELL, G., and SINGLETON, W. R. **Use of controlled low temperature in evaluating the cold hardiness of inbred and hybrid maize.** *Agron. J.* **41.** 34-40. 1949. [Dept. Genet. Connecticut Agric. Exp. Sta.] **892**

Strains of sweet corn are not necessarily less tolerant to cold temperatures at germination than are strains of starchy corn; variation occurs in both kinds of seeds and resistance to cold depends primarily on the genetical constitution of the embryo rather than on the sugar/starchy relationship of the endosperm. Previously observed differences in behaviour of the two types of seed may possibly be ascribed to imperfect handling and drying of the sweet corn seed which later impairs germination, as sugary seeds require more careful drying than do starchy seeds.

The origin of sweet corn and its future extension to other, colder, climates are discussed in the light of these observations.—From Authors' summary. See also *Plant Breeding Abstracts.*

SARKER, B. C. R. **The stability of carotene in artificially-dried plant material on storage.** *Quart. Bull. Mich. agric. Exp. Sta.* **31.** 165-9. 1948. **893**

When well-dried barley plant powder (3.8 per cent moisture) was tightly packed and stored in light-proof containers under atmospheric conditions and at a low temperature, 85 per cent of the original carotene was preserved for more than one year. Material dried to 14.8 per cent moisture and kept *in vacuo* in the dark retained less than 65 per cent of the carotene after 9 months of storage.—K.J.S.

IOWA Agricultural Experiment Station. J. Paper No. J1595. **Germination of freshly harvested oats.** By *L. M. Bass. Proc. Ass. Off. Seed Anal. 38th Annual Meeting.* pp. 47-52. 1948. [Lithographed.] **894**

This investigation was undertaken in an attempt to find a speedier alternative to the official pre-chilling method used to induce germination in freshly harvested oats. Results when the sample was germinated at 15°C. were as good as those obtained by the use of the official method, while the test at 15°C. required only seven days as compared to the twelve days required by the pre-chilling method.—T.D.H.

THOMAS, R. O. **Photoperiodic responses of maize.** *Iowa St. Coll. J. Sci.* **23.** 86-8. 1948. **895**

Subjecting maize plants from Guatemala to a short day period of 11 hr. at Ames, where the natural summer day length is 13.5 to 16 hr. hastens the appearance of floral primordia, and accelerates flowering. Shading the plants for 4 weeks, beginning 4 weeks after seedling emergence, was the most successful treatment, in some cases bringing forward the time of pollen shedding by 31 days. Relatively high temperatures together with short days provide optimum conditions for differentiation and growth of reproductive structures in the material studied.—T.D.H.

BORTHWICK, H. A., HENDRICKS, S. B., and PARKER, M. W. **Action spectrum for photoperiodic control of floral initiation of a long-day plant, Wintex barley** (*Hordeum vulgare.*) *Bot. Gaz.* **110.** 103-18. 1948. [Bur. Plant. Ind. etc., Beltsville, Md] **896**

The variety of barley used (Wintex C.I.6127) was suitable for investigation because it flowers and fruits readily without special low temperature treatment. It remained vegetative with an 11.5 hr. photoperiod and 12.5 hr. dark period but an interruption of the dark period with light of sufficient intensity stimulated spikelet formation. The most effective quality of light (i.e. wavelength) and time of giving light were investigated. Total energy required to promote flowering, if applied continuously throughout the 12.5 hr. dark period, was about ten times as great as when applied in the 2-hour period near the middle of the dark period (6.5 hrs. after beginning).

" The action spectra indicated that essentially the same pigment was involved in transferring energy to the photoperiodic reaction both in long-day and in short-day plants. A working hypothesis based on the assumption that flowering both in long-day and in short-day plants is controlled by the same substance and that effectiveness is due to optimum concentration is discussed."—D.B.

QUINBY, J. R., and KARPER, R. E. **The effect of short photoperiod on sorghum varieties and first generation hybrids.** *J. agric. Res.* **75.** 295-300. 1947. [Texas Agric. Exp. Sta.] **897**

Knowledge of varietal response to changes in photoperiod might be used to furnish a basis for a genetical classification of *Sorghum vulgare.* Varieties that, under 10-hour photoperiods, differentiate their heads, or are florally inducted in 21 to 23 days are considered to be sensitive. The number of days will vary slightly if other environmental factors are variable. Differences in response due to unlike critical photoperiods might be used to differentiate between strains of a single variety, while sensitivity differences differentiate between varieties. Once a head is initiated, the time to antheses is fixed even though the short period be discontinued after head initiation. If the short period is discontinued before head initiation the plant would continue to lay down leaves and behave as though it had not been subjected to short photoperiods.

Most varieties including the milos, kalos, hegaris, feteritas, Californian White Durra, Bonar Durra, Bonita, shallu, and Freed were sensitive. Manko was less sensitive than these but more than Blackhull kafir, Sumac, Bishop, and Lemon Yellow. Dwarf broomcorn was unresponsive to the short day. Sensitivity was found to be a dominant characteristic.—T.D.H.

MUSIL, Albina F. **Distinguishing species of** ***Avena*** **by their seed. A study of cultivated oats, the fatuoids, and certain wild species of economic interest.** *Proc. Ass. Off. Seed Anal. 38th Annual Meeting.* 84-90. 1948. [Lithographed.] **898**

A description, and key to the identification of *Avena fatua, A. barbata, A. byzantina, A. sativa, A. strigosa, A. sterilis* var. *maxima* and var. *ludoviciana* together with numerous illustrations of their seeds is given.—T.D.H.

Sears, E. R. **The cytology and genetics of the wheats and their relatives.** *Advanc. Genet.* **2.** 239-70. 1948. [U.S. Dept. Agric. and Univ. of Missouri] **899**

See *Plant Breeding Abstracts.*

BUCKWHEAT

Riera, F. J. El alforfon. Su cultivo y aprovechamiento. [**Buckwheat. Its cultivation and utility.**] *Surco* **7.** 11-5. 1948. **900**

This crop, typical of the Pyrenees region (valleys and hills) has largely developed in dry farming, during the last years, for fodder and also for human consumption. A classification of the cultivated species of *Fagopyrum* is reported, the species of wider cultivation being *F. esculentum* and *F. pyramidatum.* Information is supplied on varieties grown in Spain, climatic and vegetative characteristics, physical and chemical conditions of the soil, position in the rotation, harvesting, conservation, yield, chemical composition and uses.—E.B.

United States Department of Agriculture. Agricultural Research Administration. Bur. Agric. and Indust. Chem. A.I.C.-202. **Preparation of rutin from buckwheat leaf meal and green buckwheat with hot solvents.** By *J. F. Couch, C. F. Krewson* and *J. Naghski.* 1948. pp. 7. **901**

Detailed instructions are given for the hot extraction of rutin using dilute isopropyl alcohol as solvent. Tartary buckwheat was used since this species is replacing the Japanese species. Crystallization and purifying processes are also described. —K.J.S.

LEGUMES AND GRAIN LEGUMES

Håstadius, N. Odling av sojabönor. Studieintryck från en resa i USA. [**Cultivation of the soybean: Impressions from a study tour in the U.S.A.**] *Lantm. Svenskt Land* **38.** 143-4. 1949. **902**

The soybean was extensively grown in China about 3000 years ago. It was first known in Europe through a German botanist, Engelbert Kaempfer, who spent two years in Japan at the end of the 18th century. Not until after 1875 when the Austrian researcher Friedrich Haberlandt published the results of his investigations, were cultivation experiments with this plant begun in most European countries. Asiatic varieties were used, which were not suitable for the climate in Europe and the majority of the experimental cultivations were a failure. In some regions in Rumania, Czechoslovakia and Russia these varieties ripened sufficiently early and gave a good yield.

In the middle of the nineteen thirties experiments were initiated on a small scale in Sweden with the object of producing varieties suitable for home cultivation. When war broke out no varieties suitable for Swedish conditions had been bred. The researchers have continued their work and results have continued to show improvement.

Much work has been done with this plant in the U.S.A. Among the varieties bred, mention may be made of Lincoln and Hawkeye, of which Lincoln in particular has surpassed other varieties in yield. The majority of the trials with soybean in Sweden are being conducted at Ugerup, south of Kristianstad. The soybean contains 40 per cent protein, 15 per cent fat, about 27 per cent carbohydrates and some valuable minerals and vitamins. —R.P.J.

Molnar, I. **The peanut production scheme in British East Africa—with a comparison between the climates of certain localities in British East Africa and Tropical Australia.** *J. Aust. Inst. agric. Sci.* **14.** 125-37. 1948. **903**

The East African Groundnut Scheme is briefly reviewed. The suitable climates of East Africa for growing groundnuts are compared with those of tropical Australia, but only a generalised conclusion can be reached on the basis of the presented climatological information.

Although peanut crops can be grown in a wide range of soils, the plant prefers a light textured, well drained soil with a high content of organic matter. Light soils are also preferable because they facilitate the harvesting of the underground pods. Since peanuts require well drained soil, it is unlikely that peanut growing at Katherine and Kingaroy, if practised on river flats, could benefit from subsoil moisture, or run off from adjacent ground. The description of the soils of the selected areas in British East Africa, shows that the soils which usually give the best results with peanuts, are sandy loams and red sandy loams.—J.T.B.

КВАРАЦХЕЛИА, Т. К. Почвозащитные растения. *Доклады Всесоюз. Акад. С.-Х. Наук,* 1949. Вып. 1. стр. 3-6.

Kvarachelia, T. K. [**Plants which protect the soil from erosion.**] *Doklady Vsesojuz. Akad. S.-H. Nauk,* 1949. No. 1. 3-6. [Gruzin Agric. Inst.] **904**

The merits of the Asiatic species *Phasoleus calcaratus* in this connexion are discussed. The plant is an annual, the length of the vegetative period depending on variety and time of sowing. It flowers in 50 to 90 days and seed ripens in 90 to 118 days. It is drought resistant, flourishes on comparatively poor soils where other legumes fail, and is valuable for green manure as well as for fodder. The fine penetrating roots make the plant useful for protecting the soil.

The species is tropical and sowings in the moist sub-tropics should be made not earlier than 25th. April, and much later in the dry sub-tropics. Sowing time affects green mass yield (5 to 66 t. per ha.) and seed yield (100 to 1600 kg. per ha.) If sown under maize, sorghum, or other hoed crop, it provides stubble grazing.—M.H.

UNITED STATES, Department of Agriculture, Agricultural Research Administration. R.A.S. 104 (P). **Sweet lupines offer an additional livestock feed crop to southern farmers.** 1948. pp. 2. [Mimeographed.] **905**

A new feed for live stock, seed of sweet, non-poisonous, blue and yellow lupin varieties is available commercially to farmers along the Gulf Coast of the south-eastern States. These varieties make good winter pasture, and a seed crop may be harvested during late May or early June and ground for pig and other livestock feed. Vegetative growth and seed yield of the sweet blue lupin almost equals, and that of the yellow variety equals or exceeds that of the alkaloid varieties.—K.O.

GELIN, O. E. V. Weibulls Original Klosterärt. [**Weibulls Original Kloster pea.**] *Weibulls ill. Årsb.* **44.** 20-6. 1949. **906**

When the Kloster pea was placed on the market in 1945 it was described as being decidedly superior in yield to the other available varieties. Further trials have furnished additional evidence of its great value for the whole of south and middle Sweden. It has surpassed the Weibullsholm varieties Ambrosia II and Munk. The Institute's breeding material includes many promising numbered varieties produced through crossing and selection, also new varieties which have originated following x-ray irradiation of the Kloster pea.—R.P.J.

WEAVER, R. J. **Some uses of activated carbon in contratoxification of plant growth-regulators.** *Bot. Gaz.* **110.** 300-12. 1948. [Univ. Calif., Davis] **907**

The experiments reported in an earlier paper (*Fld Crop Abstr.* 2, Abs. 89) were repeated in field plots. Experiments were conducted on kidney bean, soybean and pea. Norit A, the form in which the activated carbon was used, was applied in various ways to counteract the toxic effects of the herbicide (NH_4, 2, 4-D).

Between 100 and 500 lb. per acre Norit A was required for complete contratoxification of ammonium 2, 4-D which had previously been applied to a field soil at 10 lb. per acre. A mixture of Norit A and soil placed as a cone above the seed was an effective manner of contratoxification. Norit A mixed with soil retained its adsorptive capacity for 12 days. Coating of seeds with Norit A was not effective with soybean, pea or wheat but gave some protection to kidney bean. Dusting of the young plants with Norit A protected them against subsequent applications of the herbicide.—D.B.

REEVE, R. M. **Late embryogeny and histogenesis in** *Pisum*. *Amer. J. Bot.* **35.** 591-602. 1948. [Western Reg. Lab., Albany, Calif.] **908**

The following stages have been studied: early development of the embryo (including initiation of the epicotyl and origins of the radicle and stele promeristems); the stages in the elongation of the axis and growth of the cotyledons; and the later growth and development of radicle and epicotyl.

Theories concerning the phylogenetic nature of root and shoot are discussed with reference to embryogeny.—D.B.

HAMMOND, L. C., and KIRKHAM, D. **Growth curves of soybeans and corn.** *Agron. J.* **41.** 34-9. 1949. [Iowa Agric. Exp. Sta.] **909**

Growth curves (dry weight *vs.* time) of soybean and corn were found to consist of a series of experimental segments which were related to the growth stages of the plants. The growth curves of soybeans were characterised by having three exponential segments, while those of corn consisted usually of four.—T.D.H.

AUDUS, L. J. **Studies on the phytostatic action of 2,4-Dichlorophenoxyacetic acid and coumarin. The reversibility of root-growth inhibitions.** *New Phytol.* **47.** 196-219. 1948. **910**

Experiments on the reversibility of growth inhibitions in roots of *Pisum sativum* and *Lepidium sativum* induced by low concentrations of 2,4-D and coumarin are described. With 2,4-D (0.1-0.33 ppm) and with coumarin (30-100 ppm) the initial rate of inhibition is limited by the rate of entry of inhibitor into the meristem cells. The primary inhibitions of longitudinal root growth induced by 2,4-D and coumarin are, after a lag period of varying duration, completely reversible and this reversibility is independent of concentration over the ranges stated above. The lag period which varies with inhibitor and species seems to be determined mainly by the restoration of normal dynamic growth equilibrium and not by the speed of removal of the inhibitor. It appears, however, that secondary irreversible inhibitors are attendant on the distraction of the normal dynamic growth equilibrium and the possible accumulation of metabolic e.g. amino-acids to toxic concentration levels. The total extent of growth recovery is thus determined mainly by the extent of the secondary inhibitions.—K.J.S.

MORRIS, H. D. **Soluble manganese as a factor affecting the growth of various legumes in culture solutions and in acid soils.** *Iowa St. Coll. J. Sci.* **23.** 55-6. 1948. **911**

Toxic concentrations of Mn in culture solutions varied from 1 to 10 ppm according to the legume. In order of sensitivity the legumes were lespedeza, sweet clover, soybeans, cowpeas and peanuts.

The toxicity symptoms exhibited by the different legumes varied greatly, but were confined almost entirely to the leaves. Different legumes absorbed different amounts of Mn from the same solution so that tolerance to Mn was determined by the ability of the plant to absorb it and the ability to tolerate large amounts of Mn within the plant. Difference in tolerance by two strains of Korean lespedeza was correlated to their relative growth under acid and alkaline soil conditions. The strain showing least tolerance grew relatively poorer under acid and better under alkaline soil conditions. No alleviation of Mn toxicity was obtained by increasing either the calcium or phosphorus level in the nutrient solution, but an increased iron concentration from 0.2 to 1.0 ppm greatly reduced Mn toxicity. Iron deficiency and manganese toxicity symptoms were not identical. Lespedeza and sweet clover exhibited identical toxicity symptoms when grown on acid soil and in cultures containing high concentrations of Mn.—T.D.H.

Grainger, J. **Growth cycle metabolism of plants in relation to flowering.** *Ann. appl. Biol.* **35.** 624-37. 1948. **912**

Previous work on the factors correlated with, or inducing a change from the vegetative to the reproductive phase in plants is discussed. Among these a high carbohydrate/nitrogen ratio, photoperiodic effect, and micro nutrient supply are mentioned. Analyses including percentage of total carbohydrate, nitrogen (Kjeldahl) and ash were made at various times in the growth cycle in six plants of varying growth habit. The formation of flower initials in fumitory, leek, radish and yellow water-lily corresponds to a maximum in the curve showing percentage of total carbohydrate plus percentage of ash in the whole plant. Peas and beans make their flower initials very early in the growth cycle, at a time when the amounts of carbohydrate plus ash are high because of the attachment of the plant to the large seed. These two therefore also make their flower initials at a virtual maximum of carbohydrate plus ash. All the plants have mobile carbohydrate. The distribution of nutrients after flowering is discussed.—T.D.H.

Allen, O. N., and Allen, Ethel K. **A survey of nodulation among leguminous plants.** *Proc. Soil Sci. Soc. Amer.* **12.** 203-8. 1947. [Dept. Agric. Bact., Univ. Wisconsin] **913**

A study has been made of rhizobia and leguminous plant relationships directed, first, toward ascertaining the extent of nodulation among members of the Leguminosae, and second, toward effecting a census-taking of plant species studied in host inoculation tests. To date, 887 leguminous species, contained in 167 genera, are reported nodulated, and 77 species of 17 genera are apparently lacking nodules. In practically all instances investigators have focussed their attention upon members of the sub-family Papilionatae and least upon species in the Caesalpinioideae. Host plant inoculation tests have employed 487 plant species of which 256 are contained in 15 plant genera. In recent studies data evidencing versatility in the ability of rhizobia strains to form nodules on leguminous plants, irrespective of cross-inoculation group boundaries, have prevailed.

The importance of continued interest in studying critically the factors influencing nodulation is emphasized. A re-evaluation of the present taxonomic status of the rhizobia in keeping with our present knowledge of the root nodule organisms and their practical usage appears warranted.—Authors' summary.

Kernkamp, M. F. **Chemical treatment of soybean seed in relation to nodulation by nodule bacteria.** *Phytopathology* **38.** 955-9. 1948. [Minnesota Agric. Exp. Sta.] **914**

In carefully controlled experiments the application of Spergon with Nitragin (seed inoculant) did not influence nodulation when the seed was planted in soil that already contained the bacteria; in a field experiment seed treatment with Spergon, New Improved Cerasan or Semesan Jr. had no effect on nodulation or yield. There may be some adverse effect of seed dressings if the soil is low in nodule bacteria, but with the widespread cultivation of soybeans it seems likely that nodule bacteria are abundant in most fields.—K.J.S.

Hermann, F. J. **Botany—Notes on North American leguminosae.** *J. Washington Acad. Sci.* **38.** 236-8. 1948. [U.S. Dept. Agric.] **915**

Transfers and changes of status are proposed for several species and varieties, of *Astragalus*, *Tephrosia* and *Desmodium*. *Phaseolus neglectus* sp. nov. from Mexico is described.—D.B.

OIL CROPS

Yazicioglu, T. Türkiye'nin nebatî yag zenginligi. [**Turkey as a country for the production of vegetable oils.**] *Ankara Yüksek Ziraat Enstitüsü.* **150.** pp. 126. [German summary, 109-19.] 1945. **916**

In working for the "International Commission for the Study of Oil Materials" Turkey has investigated the preservation and extraction by hand, horses and mechanized means, of 96 types of oil seeds and 55 types of oil. One-third of the harvested cotton seed is worked up for oil, and sesame culture is widely practised. Poppy seed and linseed oil are used in industry for varnish. Sunflowers as oil plants are new. The composition and properties of other seeds and oils are given in excellently composed tables.—From English translation of the German summary.

DONA' dalle ROSE, A. La semente di lino da olio della Turchia. [**Oil flax seed from Turkey.**] *Ital. agric.* **85.** 128-30. 1948. **917**

Oil flax seed originating in Turkey was sown in spring 1947 in many Italian regions, and on the whole, crops were failures. In this lot of imported seed, three principal varieties of *Linum usitatissimum* L. have been noted, one of which has given satisfactory results. Damage has been greater due to the fact that it was not known that three varieties, with a different vegetative period, were present, and seeds have often been mixed. A high percentage of weed seeds was also included. Agronomical factors, such as the different environment are considered to have contributed to this unsuccessful cultivation.—E.B.

LONDON: Colonial Office. **Report of the West African Oilseeds Mission.** London, 1948. pp. 60. **918**

This report gives a brief description of the soils, climate, vegetation, water supplies and potential yields of areas in the Gold Coast, Nigeria and the Gambia considered suitable for groundnut cultivation under peasant farming and later under mechanization when the benefit of this has been demonstrated. A plan of long-scale experimental work in the middle rainfall belt of West Africa is outlined. Superphosphates are required in existing areas of northern Nigeria where P deficiency is the limiting factor. The scheme is based on a capital expenditure of the order of £25 million and is expected to produce 225,000 tons of shelled groundnuts annually. Social and economic effects on the territories involved are discussed.—K.J.S.

REVISTA DE AGRICULTURA, COSTA RICA. La semilla del zapote, una gran fuente oleaginosa. [**The seed of *Calocarpum mammosum*, a valuable source of oil.**] *Rev. Agric., Costa Rica.* **21.** 81. 1949. **919**

Attention is drawn to the potential value of *Calocarpum mammosum*, a tropical tree common in Costa Rica but not greatly esteemed. The fruit is eaten but the seeds are wasted. The seeds contain, however, a high percentage of valuable oil. Industrial uses and methods of extracting this oil are outlined.—G.M.R.

KRABBE, N. Mejetaerskning af Frø. [**Combining of seed (in Denmark).**] *Dansk Frøavl* **32.** 46-7. 1949. **920**

Mustard has been combined to the greatest extent in this area (Skorlund, near Rødvig). As a rule it ripens uniformly and as it does not shed particularly easily, it is eminently suitable for combining direct. Poppy is also combined direct. Oil flax is slightly more difficult, but as it does not shed, it can be allowed to stand until well ripened. It requires sharp knives.—R.P.J.

BILLUND, J. K. Oliehør 1949. [**Oil flax 1949.**] *Dansk Frøavl* **32.** 124-6. 1949. **921**

The most suitable time of sowing oil flax varies from year to year, but is generally considered to be in the middle of April. The rate of seeding is about 90 kg. per ha., and the depth of sowing 1 to 2 cm. Control of weeds after the time of sowing is difficult. If it is necessary, harrowing must take place along the drills after the flax has come up well. Experience indicates that great caution is necessary in regard to the use of hormone derivatives. Oil flax is harvested best with the self binder.—R.P.J.

WAGENINGEN, Nederlands Vlasinstituut. VlgSchr. No. 2. De resultaten van de eerste proeven met olievlas. [**The results of the first trials of linseed.**] 1949. pp. 2. **922**

In the Netherlands, *Linum usitatissimum* is grown generally for fibre. A preliminary trial of twenty American and Scandinavian oilseed varieties for their value especially in the fertile, moisture-retaining sand soils shows that it is possible, and at present prices would probably be profitable, to grow linseed in the Netherlands. The Danish Daehnfeldt's Elite No. 369 appears to be the variety most worthy of trial as yet. Suitable technique is outlined. It includes early sowing, say, in March, at the rate of 80 kg. per ha. [64 lb. per acre] in 20 cm. [8 in.] drills.—G.M.R.

FIBRE CROPS

ORTIZ, A. G. Los productores de algodón y la industria textil. [**Cotton growers and the textile industry.**] *Agric. trop.* **4.** No. 12. 43-5. 1948. [Secretary, Nat. Fed. Cotton and Oil Plant Growers, Colombia] **923**

The annual production of cotton in Colombia is 7 million kg., but the requirements of the cotton mills are 25 million kg., so that a deficit of 18 million kg. has to be covered by costly imports. The present article forms part of a discussion which is taking place in the Colombian press. The author considers it well possible to supply home requirements with home-grown cotton; the Department of Tolima alone has excellent conditions and excellent lands, sufficient to cover the requirements of all Colombia. Obstacles are mainly of a social and economic character, concerned with conditions of land tenure, the prices obtained by the growers, etc. —G.M.R.

WILLATT, N. **Increased cotton production in British Africa.** *Crown Colon.* **19.** 75-6. 1949. **924**

This article points out some of the difficulties involved in increasing production and makes some suggestions for increasing cotton production in British Africa.

If the African cultivator is to raise his level of production systematically he must be encouraged to adopt techniques for early ploughing and planting, correct spacing, proper weeding, complete crop-picking and proper crop rotation. Again a general improvement in marketing methods is essential to any successful programme for increased African cotton production. A much smaller number of ginning units concentrating on a higher degree of uniformity of product, would tend to render cotton from the colonies more acceptable in Lancashire mills. The Tanganyika groundnuts project is expected to yield valuable data to cotton-growing interests as regards mechanical cotton cultivation and soil conservation.—K.O.

CHENG, K. S. **The tree-cotton in Yunnan.** *Emp. Cott. Gr. Rev.* **25.** 279-80. 1948. [Yu-Yun Cotton Sta., Kaiyuan, Yunnan, China] **925**

Acreage under the perennial *Gossypium barbadense* is being widely expanded in Yunnan province and will enable China to reduce her imports of high quality Sea Island cottons. Some account is given of the tree cotton, its introduction, growth and development in the country. Of six distinct varieties used in breeding work, the Kaiyuan tree-seeded variety with a staple length of 1.187 to 1.25 in. is now recommended to farmers. Average annual yield is about 260 lb. of seed cotton per acre but this could be improved, and two experiment stations are now engaged in breeding new strains and improving methods. *Imperata* sp., *Cyperus rotundus* and *Bidens bipinnata* are weeds for which efficient controls are being sought.—M.E.E.

INDIAN COUNCIL OF AGRICULTURAL RESEARCH. Misc. Bull. No. 66. **Memorandum on fibres other than cotton and jute.** By *J. K. Sircar.* 1948. pp. 60. **926**

Fibres requiring immediate development in India are the hard fibres sisal, aloe and bowstring hemp; the soft fibres sunn hemp, Deccan hemp and soft or true hemp; and the textile fibres flax and nettle fibres.

Recommendations are that model sisal plantations be started at Bihar, Madras, Mysore and Bombay with training facilities for farmers. The same applies to aloe fibres. Bowstring hemp can be grown successfully in Assam and South India; experimental cultivation and extraction of the fibre are needed there. Considerable experimental work is recommended for the improvement of sunn hemp and its fibre in the U.P., Central Provinces, Bengal, Madras, Bihar and Bombay. Deccan hemp should be developed in the Deccan for the Central Provinces. Higher grade flax has to be produced on the foot-hills of the Himalayas but low-grade fibre can be grown in Bengal, Bihar and U.P. and the Punjab. *Rhea* and nettle fibre should be grown experimentally before large scale planting. The necessity for mechanical fibre extraction implements is stressed. —K.J.S.

TORO, A. P. La producción de fibras duras en América. [**The production of hard fibres in America.**] *Cuad. verd.* No. 13. pp. 42. [English summary, 38-42.] 1947. **927**

The principal plants supplying hard fibre are *Musa textilis* Nee (Manila hemp), *Agave* spp. (henequen) in particular *A. fourcroydes* Lem. and *A. sisalana* Perrine, other *Agave* spp. furnishing a fibre known as istle, *Furcraea gigantea* Vent. (Mauritius hemp), *Aechmea magdalenae* André (pita floja), *Phormium tenax* Forst. (New Zealand flax), and *Sanseviera* spp. A statistical review is presented of production in Mexico and elsewhere before the war, when both the world area of hard fibres and the world demand increased but prices fell. During the war the difficulty of obtaining hard fibres from Africa and Asia gave an impetus to the only organized commerce in Central and South America, that in henequen. Suggestions are made for stimulating American hard fibre production to meet post-war needs and for safeguarding it against competition.—G.M.R.

PINA, A. Roso de. El esparto y su utilización industrial. [**Esparto grass and its industrial utilization.**] *Surco* **7.** 5-8. 1948. **928**

Stipa tenacissima, a perennial grass, grows spontaneously over 865,000 ha. in Spain, mainly in the southern provinces, and it is utilized for the manufacturing of paper, ropes, mats, etc. Its cultivation is still limited. An Official Commission has been appointed during last year in order to supervise production and consumption of esparto. Habit of the plant, harvesting, and industrial processes for the extraction of the fibre are described.—E.B.

MARTINEZ, R. V. Producción del fique en Colombia. [**Production of sisal in Colombia.**] *Agric. trop.* **4.** No. 12. 13-5. 1948. [Director, Dept. Agric. Econ., Min. Agric. Colombia] **929**

Some interesting statistics on the growing of sisal in Colombia show the annual production to be 10,287,000 kg. (1946 figures). Santander has the largest area, followed by Antioquia, but sisal is grown in all parts of Colombia, principally by small-holders who find it a cash crop cheaply produced on their poorest land. There are very few large plantations.—G.M.R.

OLDERSHAW, A. W. **Linseed needs.** *Fmr's Wkly* **30.** 47. 1949. **930**

The importance of growing linseed for flax or seed, on well limed soil is stressed. Experimental applications of all types of manure indicate that linseed for seed requires the nutrients from a complete manure.

Linseed, owing to its open nature is a good crop in which to sow clover " seeds " in " layers "—but these small seeds are unlikely to be a success unless sufficient lime is present.—K.O.

РЫЖОВ, С. Н. Направленная переделка природы почв в условиях орошаемого земледелия. *Почвоведение*, 1949. *No.* 2, стр. 79-94.

RYŽOV, S. N. [**Measures for soil restoration under irrigation**] *Počvovedenie*, 1949. No. 2. pp. 79-94. [Taškent] **931**

The work is concerned with improving cotton yields in Soviet Central Asia. The data indicate that, in the irrigated zone of agriculture in Central Asia, the Dokučaev-Viljjams complex may be resolved into the following elements: (1) The herbage break in a rotation may be composed of a mixture of *Medicago sativa*, *Lolium italicum* and *Dactylis glomerata*, (in a rotation with a prolonged sowing of cotton it is necessary to use an annual grass with a cereal cover crop); (2) a shelter belt of trees is beneficial as a factor in lowering the level of the water-table in irrigated areas, thus preventing salinization as well as rapid evaporation. The need to adapt agrotechnical measures according to conditions of each irrigated area is stressed.—M.H.

WAGENINGEN, Nederlands Vlasinstituut. VlgSchr. No. 1. De resultaten der vlasrassenproeven over de jaren 1946 en 1947. [**The results of the flax variety trials, 1946 and 1947.**] 1948. pp. 2. **932**

Twenty flax variety trials in 1946 and 1947 tested in particular the value of three new varieties bred by Hylkema and named Percello, Hollandia and Formosa, in comparison with the varieties normally grown, especially Concurrent. Results are outlined. A full report is available on application to the Institute. The three new varieties are commended to growers for trial.—G.M.R.

JANNACCONE, A. Una nuova razza di canapa (*Cannabis sativa* L. var. *albicata* Jannaccone). [**A new hemp variety** (*Cannabis sativa* **L. var.** *albicata* **Jannaccone**).] *Agric. ital.* **47.** 205-20. 1947. [Istituto di Agronomia e Coltivazioni erbacee dell'Università di Napoli (Portici)] **933**

In a hemp field in the province of Naples in July 1938 the author found some plants which, after flowering, had leaves and stem of a creamy white colour. The plants were reproduced and, since 1939, yield and quality of the fibre appeared to be good. As a result of trials carried out between 1940-46 with the purpose of studying the nature of the phenomenon, the author arrives at the conclusion that the albino character is hereditary and that a mutation has taken place with the formation of a new variety. This variety presents a gradually increasing albinism, which is complete when physiologic maturity is reached, has silver-grey fruits, is slightly earlier than the common hemp, is high yielding in fibre (which is of a good quality for colour and resistance), and is more exacting in respect of quality of the soil and moisture than the common hemp. The author is now studying the possibility of seed production in view of bringing this variety into cultivation.—E.B.

EL HINEIDY, M., and ALLAM, F. **Cotton crop yield in relation to application of fertilizers.** *Nature, Lond.* **163.** 362. 1949. [Faculty of Agric., Fouad Univ., Giza] **934**

Previous attempts at studying the effect of fertilizers on cotton yield have led to contradictory results. The authors, using foliar analysis as an indication of the nutrient conditions and yield of the plant, have found that any fertilizer addition gives superior yields to the unfertilized plots. Addition of potassium or phosphorus seems to have little effect on yield, but the soil nitrogen status is low and hence, application of nitrogenous fertilizer results in increased yields. Nitrogen is best supplied in the form of ammonium sulphate, as the sulphate ion will help to reduce the alkalinity of the soil (the pH usually being about 8.0) and so render available some of the naturally occuring unavailable phosphorus.—T.D.H.

PADEN, W. R. **Response of cotton and changes in chemical properties of soil from continuous use of various sources of nitrogen fertilizers.** *Proc. Soil Sci. Soc. Amer.* **12.** 289-93. 1947. [Dept. Agron., South Carolina A.E.S., Clemson] **935**

The experiment was begun in 1928, 18 different sources of nitrogen being used in the experiment, with cotton being used continuously as the test crop. Yields from limed and unlimed plots receiving no other fertilizers were 65.5 and 63.8 per cent of the corresponding plots receiving sodium nitrate, superphosphate, and potash. Yields from limed and unlimed plots receiving only superphosphate and potash were equal to 69.4 and 64.6 per cent, respectively of the plots receiving sodium nitrate in addition. It was found that the continuous use of certain sources of nitrogenous fertilizers may reduce the amount of exchangeable Ca to the extent that calcium deficiency is likely to occur.—T.D.H.

ESBERK, H. T. Türk keten lifleri uzerinde etüdler. [**Studies on Turkish flax fibres.**] *Ankara Yüksek Ziraat Enstitüsü* **151.** pp. 96. 1947. [German summary, 79-90.] **936**

Experiments on the characterization of flax plants and their value for obtaining fibres were performed by the author on 65 different flaxes, straw and seed capsules, 76 different crude fibres, 50 workable yarns and 56 workable webs.

Tables showing plant height, length and thickness of stem, and number of capsules of a type intermediate between oil linseed and Riga fibre are given, together with figures illustrating "root yield", percentage of chaff and seed, weight and seed size, and average oil content. Detailed procedure and results of experiments to classify Turkish linseed plants from the standpoint of production to fibrous material are also included. Yarn numbers were obtained by weighing, and varied from 8 to 40. Weight per sq. m. of webs varied from 170 to 690 grm. There were 5 to 18 warp threads and 9 to 18 weft threads per cm. Weft breaking load was 19 to 135 kg. and the warp breaking load from 24 to 109 kg.—From English translation of the German summary.

GADKARI, P. D., and AHMAD, N. **A note on the prediction of spinning value of Gaorani (Bani) cottons.** *Indian J. agric. Sci.* **17.** 55-7. 1948. [Nanded (P.D.G.) Indian Tariff Board (N.A.) Hyderabad] **937**

A new formula is given for predicting the spinning value of cotton samples and thereby estimating the probable quality of the cotton. Earlier work on prediction formulae is also discussed. The Bani (Gaorani) cottons of Hyderabad State have been grouped as *Gossypium arboreum* var. *neglectum* forma *indica* and are distinct from the north Indian cottons belonging to the class *G. arboreum* var. *neglectum* forma *bengalensis*.

The homogenous nature of the Bani cottons was demonstrated statistically by the correlation coefficients of a large number of samples collected over a period of 9 years. In the Gaorani strains fibre weight per inch appears to be more important in determining spinning performance than mean fibre length.—M.E.E.

KING, H. E., and MUNRO, J. M. **A method of determining hair weight of cotton.** *Emp. Cott. Gr. Rev.* **25.** 271-6. 1948. [Cotton Expt. Sta., Barberton, S. Africa] **938**

A very rapid method of considerable accuracy for determining hair weight of cotton relies essentially on the detaching of a small tuft from the combed seed in such a way that no tearing out is required before counting. A specially designed holder enables the hair to be counted before cutting. Details of the technique employed are given together with examples of the results obtained by this method.—M.E.E.

KING, A. E. **Percentage of short hairs as a character of importance in Barberton cotton samples.** *Emp. Cott. Gr. Rev.* **25.** 277-8. 1948. [Cotton Expt. Sta., Barberton, S. Africa] **939**

For many seasons the spinning quality of cottons grown in this area has not been indicated by changes in yarn length, mean hair weight, or maturity and recent statistical analysis has shown that the apparent lack of relationship has resulted from the mutually cancelling effect of the hair weight and percentage of short hairs (two factors). In Barberton cottons the percentage of short hairs tended to increase with decreasing hair weight and was sufficient to counteract the improvement in yarn strength.—M.E.E.

GADRE, R. N. **Cotton planning for the Central Province.** *Indian J. agric. Econ.* **3.** 73-8. 1948. **940**

Previous to the partition, the manufacture and production of cotton was planned as a single economic unit, but now with the production areas, especially of long staple cotton, largely in Pakistan, and the manufacturing areas in the dominion of India, the problem of supplying the mills, and maintaining the standard of production has been raised. The solution will be in a larger production area of medium, and particularly of long staple cotton, in some reduction of the area growing short staple cotton, in increased yields per acre, and in the introduction of improved strains of cotton with a higher ginning percentage.—A.D.H.

LAMBOU, M. G., KING, Gladys C., and CONDON, M. Z. **Effect of chemical treatment prior to storage on viability and growth of cottonseed.** *Science* **108.** 563-4. 1948. **941**

Tests were made of the viability of cotton seeds conditioned to a 12 per cent moisture content and stored with 4,6-*bis*-chloromethyl xylene (DCB) in propylene glycol dipropionate (PGDP), in ratio 1 : 8 by weight. Samples of 50 seeds were withdrawn from each storage jar for determination of germination counts and seedling growth at 30 day intervals for 6.5 months. Growth measurements of seedlings that germinated were made at intervals up to 12 days. Recorded data show that the treatment maintained viability and growth at a level 20 to 44 per cent higher than in untreated controls, and suggests that DCB may have growth-promoting properties. During storage the formation of free fatty acids was prevented by the chemicals.—K.J.S.

ARNDT, C. H. **An evaluation of certain substituted phenol esters for the treatment of cotton seed.** *Phytopathology* **38.** 978-87. 1948. **942**

Cotton seeds infested by *Colletotrichum gossypii* were treated with substituted phenyl esters and the seeds germinated in sand culture at 24°C. The acetate of 2,4,5-trichlorophenol was effective in preventing seedling infection by the fungus; the formate and proportionate esters were slightly less effective. The position of the Cl atoms in the benzene ring is important; the 2,3,4-6-tetrachlorophenyl acetate was more toxic to both fungus and host than the 2,4,5-trichlorophenyl acetate. Field results indicated that 2,4,5-trichlorophenyl acetate at the rate of 1 grm./kg. of seed is a satisfactory treatment for the elimination of the infestation of fuzzy cotton seed by *C. gossypii*.—K.J.S.

TEXAS Agricultural Experiment Station. Bull. 699. **Control of cotton root rot by sweetclover in rotation.** By *E. W. Lyle, A. A. Dunlap, H. O. Hill* and *B. D. Hargrove*. 1948. pp. 21. **943**

This bulletin presents the results of a 5-year study at the Blackland Experiment Station on the effectiveness of winter and winter-summer crops of *Melilotus indica*. (referred to as indica) and *Melilotus alba* var. *annua* (hubam) in rotation with cotton for the control of root rot.

When sweetclovers were used as green-manure crops (ploughed under in early spring) and followed by cotton the same year, cotton root rot was delayed and decreased and increases in yield were found in most cases.

Delay and marked reduction in cotton root rot and the highest yields of cotton were found in the plots in which hubam had been grown to maturity the previous year. Outstanding yield increases in cotton were obtained during the first 2 years following the rotation with mature hubam and there was also an apparent increase in the third-year cotton after hubam.

The degree of root rot control, as shown by the increased yield of cotton in plots following mature hubam the previous year, is proportional to the reduction in number of cotton plants killed early in the season by root rot. Late-season root rot has less effect on yield.

The beneficial effects of the hubam in rotation appeared to diminish with successive plantings of cotton, making the ploughing under of the mature hubam crop necessary about every third or fourth year for best results.—Authors' summary.

SMITH, A. L. **Control of cotton wilt and nematodes with a soil fumigant.** *Phytopathology* **38.** 943-7. 1948. [Alabama and Georgia Exp. Sta.] **944**

Markedly increased yields of several cotton varieties and almost complete control of the wilt fungus (*Fusarium oxysporum* f. *vasinfectum*) and nematodes were obtained by the use of 31 and 37 gall. per acre of Dowfume W-10 a soil fumigant containing about 10 per cent ethylene dibromide and 90 per cent naphtha B, supplied by the Dow Chemical Company, Michigan.

More economical control and comparable yields were obtained by applying only 12.5 gall. of the fumigant per acre in the row, except in the case of one variety highly susceptible to wilt nematode. —K.J.S.

LEDING, A. R., and BRINKERHOFF, L. A. **The effect of soaking cotton seed on the incidence of angular leaf spot in New Mexico and Arizona.** *Phytopathology* **38.** 974-7. 1948. **945**

Contrary to Egyptian experience experiments at State College, New Mexico and Sacaton, Arizona show that the incidence of angular leaf spot is considerably higher where cotton seed is soaked in water, a practice used occasionally on fuzz cotton seed to ensure rapid germination.—K.J.S.

GIDDINGS, N. J. **Some studies of curly top of flax.** *Phytopathology* **38.** 999-1002. 1948. [U.S. Dept. Agric.] **946**

In greenhouse tests some 37 commercial varieties of flax including ornamental strains were found to be very susceptible to infection by all of the curly top virus strains available. The curly top vector *Eutettix tenellus* is however relatively inactive in the cool weather when flax makes most of its growth. Early planting or warm, dry weather in the autumn are conducive to curly top infection and resultant crop damage. Some of the more resistant ornamental flax species may be helpful in breeding for curly top resistance and also in differentiating curly top virus strains.—K.J.S.

COLHOUN, J. **Varietal resistance of flax to disease.** *Ann. appl. Biol.* **35.** 582-97. 1948. **947**

Experiments were carried out to study the reaction of a wide range of both fibre and oil varieties of *Linum usitatissimum* to attack by *Polyspora Lini* Laff., *Colletotrichum linicola* Pethybr. and Laff., *Phoma* sp. and *Melampsora Lini* (Ehrenb.) Lév.—From Author's summary.

SOUTH AFRICA, Department of Agriculture. Sci. Bull. 255. **A wilt disease of** *Crotalaria juncea* **Linn (Sunn Hemp) found in S. Africa.** By *A. F. Hean*. 1947. pp. 15. **948**

The wilt (due to *Fusarium moniliforme* var. *subglutinans*) may cause reduction in stand up to 30 per cent and seems to be increasing where sunn hemp is included too often in the rotation and is grown under irrigation. Under laboratory conditions spores of the fungous are viable for at least 10 months so that rotation would need to be a long one to eliminate the disease ; a rotation of at least 3 years is advocated. Soil treatments do not appear practicable but plant sanitation and seed dressing offer promise of success, although it is not certain that the disease is seed-borne.—K.J.S.

ТЕР-АВАНЕСЯН, Д. В. Одна из причин, вызывающая изменчивость у хлопчатника. *Доклады Всесоюз. Акад. С.-Х. Наук* 1949. Вып. 1. стр. 23-5.

TER-AVANESJAN, D. V. [**One of the causes of mutation in cotton.**] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1949. No. 1. 23-5. [All-Union Inst. Plant Industry] **949**

An analysis of plants of the 1st and 2nd year grown from seed of deformed bolls of cotton or pods of *Vigna sinensis* has shown that there are great variations in qualitative characters, including yields, and in morphogenetic features. There is indication that causes leading to the deformed bolls or pods could be either unsatisfactory pollination or unsuitable conditions of growth.—M.H.

BAILEY, A. E. **Cottonseed and cottonseed products. Their chemistry and chemical technology.** 23 × 15. pp. 959. New York: Interscience Publishers, Inc., 215 Fourth Avenue 1948. £5 5s. **950**

This book, containing contributions from twenty-four different authors and edited by A. E. Bailey, is a very comprehensive and detailed account of all aspects of cottonseed and the cottonseed industry, written as a text and reference book for students, workers within the industry, those engaged in the manufacture of cottonseed products, and for scientists and technologists working in related fields.

Opening with a history of cotton and the cottonseed industry the book leads on to a consideration of world production and consumption, with special reference to the six main cotton-producing nations of the world, the United States, India, Russia, Brazil, China and Egypt, which between them account for more than nine-tenths of the total commercial cottonseed output. The most important cottonseed processing country and by far the world's largest consumer is the United States, which besides using the greater part of its own production, imports minor amounts from foreign sources. Foreign trade in cottonseed is small compared to trade in the other important oil bearing materials, by far the greatest amount being consumed within the country of origin—Egypt the major exporting country retaining 61 per cent of her total production from 1937-1939.

The next major subdivision of the work deals with the structure, physiology and composition of cottonseed. Cottonseed is described as comprising two principal parts ; the hull or spermoderm from which staple cotton and " linters " arise, and the kernel or embryo constituting one half of the weight of the fuzzy seed, and containing more than 90 per cent of the protein and 95 per cent of the total oil. The North American upland type of cottonseed, *Gossypium hirsutum* in contrast to the Egyptian cottonseed, *G. barbadense* is densely covered with linters and appears white or grey, even after " ginning " while the latter is free of adhering linters and appears black in colour. This difference is important as although linters are of sufficient value as a mill product to have become the basis of a separate industry, their value to the " ginner " is negative, in a sense that they are the source of a discount for an excess, and hence arises an apparent anomaly. The cottonseed is described in detail, macroscopically, microscopically, whole and in section. Cottonseed derives its importance largely from its utilization of lipids and proteins as storage reserves, in preference to carbohydrates. The lipids occur as glycerides, liquid at ordinary temperatures, while the reserve proteins are found mostly in the amorphic state as aleurone grains or in the crystalline form. The development of the different chemical constituents of the seed, the biochemical equilibria, variation in composition, with maturity environment and heredity are discussed.

Under the heading " Biological Processes of the Cottonseed " the following subjects are considered in relation to successful storage of the seed : —the properties of viable seeds, hygroscopic equilibria, germination, dormancy, longevity, heating, respiration, lipolysis, sterilization and inhibition of biological activity by chemical agents and the prevention of deterioration in field and in storage. The next four chapters, totalling over a quarter of the length of the book, are devoted to a detailed consideration of the economic importance, distribution, variation, uses, physical properties and chemistry of the pigments, proteins, oils, and miscellaneous constituents of cottonseed.

The remainder of the book is occupied with an account of methods of sampling, grading and evaluation of cottonseed, cottonseed oil, cake, meal and linters, followed by a section on cottonseed processing, and concluding with a survey of the utilization of cottonseed products. The section on processing contains many photographs and diagrams illustrating the range of machinery and equipment, used in handling, storing, cleaning, delinting, hulling, separating, crushing, and cooking of cottonseed as well as of the machinery used in the dealing with cottonseed products such as meals and cakes. The utilization of cottonseed is discussed with special emphasis on the nutritional aspects, examples of several rations for live stock utilizing cottonseed products being given.—T. D. Holmes.

SUGAR BEET

PANTANELLI, E. Coltura invernale della bietola nel mezzogiorno. [**Winter cultivation of sugar beet in the south.**] *Ann. Fac. Agrar. Bari.* **6.** 227-56. 1948. **951**

Cultivation of sugar beet in Mediterranean countries is reviewed. In south Italy sugar beet must be grown in dry farming, as the scarce irrigation water available is applied to other crops. The author refers to trials carried out in recent years in different zones of central and southern Italy. He concludes that sugar beet cultivation can be successful in many Mediterranean regions, where it can take place during spring/summer, with the assistance of irrigation if rainfall is insufficient, or during autumn/winter in dry farming, in all those regions where rainfall from September until April exceeds 400 mm. The modalities of cultivation are indicated. In winter cultivation, sowing takes place in November and harvest in May; the lower yield in weight is in contrast to that obtained in Central Europe in summer cultivation, but is to a great extent compensated by a high sugar content.—E.B.

АДАМЕНКО, Ф. И. К вопросу об усовершенствовании безвысадочного способа выращивания свекловичных семян. *Сахар. Промышл.* 1948. *No.* 2. стр. 37-9.

ADAMENKO, F. I. [**Improvement in beet seed crops by a method obviating planting out.**] *Sahar. Promyšl.* 1948. No. 2. pp. 37-9. [All-Union Sci. Res. Inst. Sugar-beet Ind.] **952**

Details of work carried out in Kirgiz SSR (Frunze Exptl. Station) and in Uzbek SSR (Taškent Exptl. Sta.) show that sowing in spring, under a cover of barley, of beet which has not been harvested and planted out, but overwinters in the ground, is to be recommended.—M.H.

ROLTO, F., and MASTRASCUSA, L. M. Ensayos comparativos de remolacha azucarera. Trabajo realizado en la Escuela de Paysandú. [**Sugar beet trials at the Paysandú Agricultural College.**] *Rev. Fac. Agron., Montevideo* **45.** 25-41. 1948. [Director (F.R.) and Asst. (L.M.M.), Paysandú Agric. Coll. and Exp. Sta., Univ. Rep., Uruguay] **953**

Preliminary trials, 1943-45, tested several U.S. varieties and one German (Klein Wanzleben). Another variety (Kuhn) was abandoned because it failed to germinate. The trials were arranged as follows: *1943.* Randomized plots with four replications; 50 cm. rows with 25 cm. between the seeds. Sown May 21 and July 14. Harvested Jan. 29, 1944. *1944.* Similar arrangement, sown June 27. Harvested Jan. 20. 1945. *1945.* Latin square arrangement; 50 cm. rows with 15 cm. between seeds, plants subsequently thinned out to 30 cm. Sown (a) March 27 and April 2; (b) July 11 and 12. A full account of weather conditions in the 3 years and a statistical study of varietal yield are presented.

The mean yield of all the varieties, in quintals (1 quintal=100 kg.) per hectare, was: 1943, 282.2; 1944, 123.1; 1945 (a) 406.7; (b) 228.7. There was in all the varieties a positive correlation between yield and the amount of rainfall during the spring and summer. U.S. 32, tested in 1943 and 1944 only, gave the highest yield, followed by U.S. 215 × 216. A marked difference in the results of early and late sowing in 1945 showed the favourable effect of early autumn sowing. Varietal difference in sensitivity to drought was marked, U.S. 32 being the most resistant and U.S. 200 × 215 the most sensitive.

Under similar cultural conditions, varietal differences in saccharose content were recorded. In general, the highest saccharose content was determined in the 1944 cultures, which may be attributable to the abnormally low rainfall in the spring and summer and the more intense light of the month of December in that year. Of the two 1945 sowings, saccharose content was markedly higher in the first sowing, as, for example, in U.S. 33, in which the percentage was 16.75 in the first and 13.30 in the second sowing.

The cultures were all unaffected by the severe frosts experienced, and there were no cases of bolting. They were resistant also to drought, but in the very dry year 1944 average yield was reduced. Of pests and diseases, the insect pest *Epicauta adspersa* proved the most troublesome and destroyed the whole of the 1943 second sowing. The fungus *Sclerotium rolfsii* caused some damage in 1943 and more especially in the late sowing of 1945. —G.M.R.

GARNER, H. V. **The manuring of root crops. 1. Sugar beet.** *Fmg* **3.** 36-40. 1949. [Rothamsted. Exp. Sta.] **954**

The report stresses the importance of ascertaining soil pH before planting sugar beet. Sugar beet usually grows well in soils above pH 6.0. The practice of providing 33 per cent to 50 per cent of sugar beet acreage with farmyard manure ploughed in in winter is a good one for it not only provides the nutrients but also improves the texture and water holding capacity of the soil.

The article gives a detailed account of the experiments carried out on sugar beet with the usual nutrients—N_2, K_2O and P_2O_5 and there are illustrations of sugar beet plants showing the effects of soil acidity and boron deficiency. The combined effect of adding NaCl to $(NH_4)_2 SO_4$ was similar to that of $NaNO_3$ alone, and the grower's belief that $NaNO_3$ produces better results than $(NH_4)_2SO_4$ was partially proved by experiment. The response of crops to superphosphate was much less marked than to that of N_2, though the effect was much greater in certain moist seasons and during the early life of the plant. An usual dressing of superphosphate is 4 cwt. per acre. The recommended procedure is to supply the Na by using either NaCl or $NaNO_3$ and then to give muriate of potash at a rate of 1 to 2 cwt. in the absence of dung and 0.5 to 1 cwt. in the presence of dung. The potash tends to improve the sugar content of the roots.

In conclusion a short description of the symptoms of the minor element deficiency diseases "Heart Rot" (boron deficiency) and "Speckled Yellows" (manganese deficiency) is given.—K.O.

BEVAN, A. P. **Beet harvester design.** *Farm Mech.* **2.** 223-5. 1948. **955**

A discussive article on the operations involved in beet harvesting and topping. It is suggested that the future will produce a somewhat large multi-row beet harvester for large growers with large areas and a separate system of split operation harvesting where the operation is divided up between a number of machines or implements some of which depend considerably on human skill for smaller acreages.—K.J.S.

BLACKWELDER, E. F. **Development of the Marbeet sugar beet harvester.** *Agric. Engng* **29.** 481. 1948. [Manager, Blackwelder Mfg Co., Rio Vista, Calif.] **956**

The Marbeet harvester developed in 1943 for Californian beet growers was used in harvesting 66 per cent of the beet acreage in that state in 1947. The Marbeet Midget mounted on a tractor and carrying a 30-in. diameter wheel with furrows of spikes is described. Among other developments under study are fan-type suction methods for pre-topping, chopping and loading tops and methods of drying the recovered tops.—K.J.S.

HIPPLE, J. L. **The International sugar beet harvester.** *Agric. Engng* **29.** 480. 1948. [Manager of Engng. I.H. Co., Chicago Ill.] **957**

The 1948 model does not differ materially from the 1947 machine. In 1947, 5000 acres of beet harvested by machine gave an average performance of 6.5 tons of beets per acre of operation and one acre of beets every 2.5 hr. of operation. The drag-type binder for differential topping of large and small beets is discussed.—K.J.S.

BARMINGTON, R. D. **The relation of seed, cell size, and speed to beet planter performance.** *Agric. Engng* **29.** 530-2. 1948. [Colorado Agric. Exp. Sta.] **958**

Tests of plate speed/cell fill relationships carried out on commercial planters indicate that seed damage is a minimum at a speed which gave 100 per cent or slightly less than 100 per cent fill. When the plate speed was slow and cell fill averaged 115 per cent or more the seed damage was greater; also when speeds were increased and cell fill decreased the seed damage increased rather rapidly. The danger of using only one inch of seed in the seed can (experimental plot work) is shown. Two inches was satisfactory.

In tests on the effect of changing the size of seed on the percentage fill it was found that a large per cent of seed in 7/64 to 8/64 in. size range may nearly double the number of seeds planted per acre compared with samples containing a high percentage of the 9/64 to 10/64 grades. In addition, seeds may be damaged. Increases in seed dropped by commercial planters ranged from 55 to 68 per cent.

Some provisional data are given on cell fill characteristics for standard and thin plates in planter seed boxes.—K.J.S.

MCBIRNEY, S. W. **The relation of planter development to sugar-beet seedling emergence.** *Agric. Engng* **29.** 533-6. 1948. [Sen. Agric. Engr, Bur. Plant Ind., Soil, and Agric. Engng, U.S.D.A.] **959**

The drop in seedling emergence in mechanical planting is usually 30 to 50 per cent and emergence may be as low as 10 per cent. The following recommendations are made as a result of 4 years work at Colorado to improve planters for beet.

Use 1-in. depth plantings for early sowings when germination is slow; use 1.5 in. depth plantings for later sowings when soil may dry out. If the planter is equipped with deep-concavity press wheels they should be assembled without space between the wheels. The press wheels should have the maximum pressure possible on them. Fertilizer boots should not be used between the disks of an opener but should be offset from outside the disk and on the side to give pressure against the seed furrow. Minimum soil disturbance round the seed is the aim.

Toothed wheels used between the press wheels may improve seedling emergence but will have to be specially made.

In experiments described, up to 78 per cent seedling emergence was obtained for early planting and up to 60 per cent for later season planting.—K.J.S.

READING UNIVERSITY, Department of Agricultural Economics. **Costs and returns from sugar beet production in the southern province in 1947.** By *G. B. Bisset* and *J. A. Mollett.* 1948. pp. 9. [Mimeographed.] **960**

On thirty recorded farms with a total acreage of 236.25 acres sown down with sugar beet, labour and power accounted for 59 per cent of the gross costs; 22.5 per cent of these were for manual labour, 26.1 per cent for contract labour, 3.4 for horse labour, and the remaining 7 per cent for tractor costs. The remaining costs were distributed in the proportion of 1.7 per cent for seed, 20.6 per cent for manuring, 7.8 per cent for transport and 10.9 per cent for rent and overhead charges.

Pre-harvesting costs amounted to an average of £23 2s. 6d. per acre, harvesting costs to £15 12s. 11d. per acre, which together with the rental and other overhead charges, and allowances for manurial residues and the value of the beet tops, gave an average net cost of £36 17s. 10d. an acre. The importance of haulage costs is emphasised by the fact that they make up 22.8 per cent of the net cost per acre.

The average yield was 9 tons per acre, and the sugar content 18.1 per cent. Increases in yield did not appear to increase cost per ton, and though costs per ton varied, returns per ton showed little variation. The average surplus on the farms was

£13 19s. 0d. per acre, 25 of the farms showing a surplus, and 5 farms a deficit. Yield per acre seemed to be the main factor influencing the growing of sugar beet.—A.D.H.

BAINER, R. **The processing of sugar beet seed.** *Agric. Engng* **29.** 477-9. 1948. [Head, Agric. Engng Div. Univ. of California] **961**

A review of published work on the California Agricultural Experiment Stations' experiments on sugar beet seed processing, including segmentation, decortication, burr reduction, etc. The chief application of processing is not to obtain single seed but to prepare these seed for precision planting. At present it is necessary to reduce the size of seed to the point where its variation does not exceed 3/64 in. if available precision planting equipment is to be used. Single seed when released by the breeders may need polishing by light decortication.—K.J.S.

MUNERATI, O. **A new method for quick detection of seed of red and yellow forage beets among sugar beet seed.** *Proc. Amer. Soc. Sug. Beet Technol.* Reg. Meeting. 1947. pp. 178-9. [Mimeographed.] **962**

It was noticed, when ascertaining whether colchicine was capable of creating polyploid races, that the white rootlets of young forage, sugar and half sugar beet plants grown from seed soaked in colchicine solution, remained white, while coloured rootlets assumed their normal colour. Experiments to test whether the layer of pigment would under certain conditions, manifest itself in a more pronounced manner and whether this principle could be used as a technique on which to base a method for detection of varieties, were performed and described. The following facts were ascertained :—

Up to a viability limit, the longer the seed was exposed to the effect of colchicine solution, the more pronounced was the pigment layer. Seed balls exposed to a 0.5 per cent colchicine solution and subsequently transferred to sand saturated with colchicine, produced young plants with rootlets manifesting their characteristic to a high degree. When germination tests were conducted with cotton wool or blotting paper, it was necessary first to immerse the seed balls in running water. When seed was exposed to colchicine solution for too short a period, and for germination, transferred to water saturated sand, the rootlets became enlarged and determination was less reliable. If when germination was advanced the germinating seed trays were removed from the thermostat and exposed to the light and temperature of the laboratory, the rootlets' colour became more pronounced.

Several tests are in progress varying the exposure of the seed balls to colchicine and others are experimenting replacing the colchicine by other solutions.—K.O.

JONES, D. P. **Insect and other pests of sugar beet.** *Fmg* **2.** 359-63. 1948. [Univ. Coll. of Wales] **963**

Sugar beet has an extensive pest fauna, the more important of which are the aphids, sugar beet root eelworm and wireworms.

The Black Bean Aphid infestations of sugar beet usually become apparent in June and reach their peak in July. Attempts to eradicate spindel trees which are this pest's intermediate host, have met with little success owing to their wide-spread abundance. Dusting and fumigation, which is achieved by the use of a long drag sheet under which nicotine is evaporated, have an effective result, but a suitable machine for this fumigation method has yet to be found.

The Peach-Potato Aphid is mainly responsible for transmitting certain virus diseases which cause reductions in yield. Sugar beet crops become infested with this aphid in the spring and ultimately viruliferous individuals, from virus-infected beet, mangolds, or spinach beet, settle on the crop. The control of this aphid is closely connected with the prevention of virus infection, mainly by insecticides. Direct attack on the aphid has little practical value.

The only effective control of beet eelworm known, is the prohibition of growing beet on the same piece of land more than once in three years.

Wireworms attack sugar beet when the crop is in the vulnerable seedling stage. The interdrilling of sugar beet with wheat as a bait for wireworms has had some success, but the main control is benzene hexachloride (B.H.C.), which is normally applied broadcast.

The beet Carrion Beetle, cutworms and mangold fly, cause relatively little damage and can be efficiently controlled by insecticides. Pigmy Mangold Beetles can be controlled by not planting mangolds and sugar beet in successive years. The Mangold Flea Beetle, Tortoise Beetles, Sand Weevils and the Silver Y Moth caterpillars, are capable of heavy damage, but appear to be restricted in their occurrence on sugar beet crops.

The future of the sugar beet industry seems to depend largely upon the extent to which the cultivation of the crop can be mechanized. The extent of singling should also be carefully considered in this connexion, for an allowance must be made for pest attack as well as other causes. Most growers endeavour to single their beet crops at the four-leaf stage, and there is much to be said for the discretionary advantage of hand singling. Insecticides and their use in conjunction with spaced drilling of segmented or mono-germ seeds also need more investigation.—J.T.B.

WARREN, J. R. **A study of the sugar beet seedling disease in Ohio.** *Phytopathology* **38.** 883-92. 1948. **964**

The fungus primarily responsible for black rot of sugar beets is shown to be *Aphanomyces cochliodes* Dech. Incidence increases with soil temperatures over 24°C. Following observations of commercial beet fields in which black rot was less severe in crops manured heavily with phosphates, tank experiments were made to test this point at different soil temperatures. At soil temperatures of 18°, 20° and 24°C, superphosphate applications at 400 and 500 lb. levels markedly reduced the number of diseased seedlings; at 28° and 32°C. the P dressings were ineffective.—K.J.S.

BARTSTRA, E. A. C., and VERBURGT, J. W. Onderzoek omtrent de minerale samenstelling van loof en wortel van suikerbieten. IV. Analysemethoden. **Research on the mineral composition of leaves and roots of sugar beet. IV. Methods of analysis.** *Med. Inst. rat. Suikerprod.* **17.** 111-22. [English and French summaries, pp. 122] 1948. **965**

In discussing analytical methods, importance is attached to the method of ashing. An alkaline ash is obtained by means of adding a solution of $FeCl_3$ to the dried sample and heating in an electric muffle oven. The determination of P, Ca, Mg, Na and K is made in the solution of this ash. The methods are outlined, with a detailed discussion of the flame-photometric method of determining Na and K. The determination of N takes place in the dried material.—Authors' summary.

ANDERSEN, Alice M. **Some factors associated with the browning of sugar beet** (*Beta vulgaris* **L.**) **seedlings in laboratory germination tests.** *Proc. Ass. Off. Seed Anal., 38th Annual Meeting.* pp. 52-8. 1948. [U.S. Dep. Agric., Washington, D.C.] **966**

Seedlings turning brown in laboratory tests are classified as abnormal and are not included in the germination percentages as germinated seeds, hence higher germination might be obtained in the field than indicated by laboratory tests. Browning is caused by a toxic substance in the pulp of the ball, and also by the fungus *Rhizopus nigricans*. There was more browning produced when blotters were used as substrate than when Kimpak, sand or soil were used, and therefore the blotter tests gave lower and less uniform germination percentages than the other substrata.—T.D.H.

ROOT CROPS

CANADA Experimental Farms Service. Pub. 672. Fmrs Bull. 88. **Field roots.** By *F. S. Nowosad, R. M. MacVicar, P. O. Ripley* and *S. B. Williams.* 1948. pp. 29. **967**

About 200,000 acres of roots excluding sugar beet are grown annually in Canada. This bulletin describes methods of growing, harvesting, storing, feeding and seed production for carrots, mangolds and swedes. The average yield of roots in 1938-45 was 10.1 tons per acre, the yield in the dry Prairie Provinces being only about 5 tons per acre. Fertilizers give very profitable returns; farm yard manure over 33 years gave an average yield of mangolds of 22.6 tons per acre as compared with 6.9 tons with no manure. Commercial fertilizer alone gave 20.5 tons per acre and with farm yard manure 22.1 tons per acre. Sowing rates are 6 to 8 lb. mangolds, 3 to 4 lb. swedes and 3 to 4 lb. carrot seed per acre in rows 26 to 32 in. apart. The cost of producing a 20-ton crop of mangolds is about $4 per acre.

Canadian seed cannot compete in cost with European seed and is grown only for an assured market. Cultivation is the same as for roots. Small cleaning machines are described for removing small pieces of stem from mangold seed and spines from carrot seed.—K.J.S.

PANTANELLI, E. Utilizzazione industriale della scilla. [**Industrial utilization of** *Urginea maritima.*] [Reprint from] *Atti Relaz. Accad. Pugliese Sci.* **4.** pp. 10. 1946. **968**

The author refers to researches carried out with squill. This plant grows spontaneously in south Italy as well as in all Mediterranean regions. The bulb can be utilized for production of ethyl alcohol (9.5 litres of anhydrous alcohol can be obtained from 1 quintal of fresh bulbs). Two byproducts remain: one can be employed as fertilizer and the other as cattle food. The vegetative period takes place in autumn/winter and the best period for collecting the bulbs is during the summer rest. The author is of the opinion that this plant could be grown in those Mediterranean regions where sugar beet is not successful, and gives instructions for its cultivation, which can take place on very sandy, loose and superficial, soil. Yield of fresh bulbs at the third year after transplantation is 250 to 260 q. per ha.—E.B.

MIÈGE, J. Le *Dioscorea esculenta* Burkill en Côte d'Ivoire. [*Dioscorea esculenta* **Burkill in the Ivory Coast.**] *Rev. Bot. appl.* **28.** 509-14. 1948. **969**

Information on wild and cultivated species of *Dioscorea* is given. *D. esculenta* (the lesser yam) was introduced about 20 years ago and its cultivation is increasing because of the economic value of its tubers. Geographical distribution and description of this species are given.—E.B.

HÖRBERG, Y. Weibulls original Tellus Bortfelder, stam 21. [**Weibulls Original Tellus Bortfelder turnip, strain 21.**] *Weibulls ill. Årsb.* **44.** 27. 1949. **970**

Tellus, strain 21 is a green-topped, yellow-fleshed turnip. In the trials of the Scanian Seed Production Association during the years 1942-46 it surpassed Svalöf Bortfelder in both bulk yield and dry matter yield by 12.8 per cent. In trials conducted by the Weibull company in Örkelljunga and also in Sörmark in Värmland Tellus, strain 21 surpassed Ped. Bortfelder, strain 4, by 3 per cent in bulk yield and also by 12 per cent in dry matter yield. During 1948 Tellus proved less susceptible to club root disease than Bortfelder. Neither of these varieties should be grown on soils known to be infected: then only Immuna II can be recommended.—R.P.J.

Horberg, Y. Nya framsteg inom resistens förädlingen med rova och kålrot. [**Recent progress in resistance breeding with turnips and swedes.**] *Weibulls ill. Årsb.* **44.** 29. 1949. **971**

Resistance breeding with roots has been conducted for a number of years at Weibullsholm and in 1936 Weibulls Immuna turnip was placed on the market. In 1943 this was replaced by Immuna II which was equal to Immuna in resistance but superior to it in yield. Strains from the cross Ped. Bortfelder × Naepe are now undergoing multiplication, of which in particular Weibulls 0685 appears very promising in all respects. In the 1948 club root trials it has proved decidedly the most resistant turnip. Weibulls 028 from the same cross together with Weibulls 013 from (Red-topped × Naepe) × (Ped. Bortfelder × Naepe) and strains from Red-topped × Naepe have proved very promising both as regards resistance and yield.

None of the swede strains placed on the market hitherto have shown such good resistance to club root disease as the turnip Immuna II. In the bred material of swedes there are now strains from crosses between swede and turnips which compete in resistance with the turnip 0685 mentioned above.

In particular Weibulls 0503, which is derived from (Bangholm × Östgöta) × Naepe turnip proved resistant in a high degree in the 1948 trials. Here it seems, however, even more difficult to combine good resistance with good yield than is the case with turnips.—R.P.J.

Comin, D., and Junnila, W. **Storing turnips in bins with forced ventilation. A progress report.** *Bi-m. Bull. Ohio agric. Exp. Sta.* **31.** 73-6. 1946. **972**

It is known that vegetables stored in slatted crates keep better than those stored in bins. Crates have the disadvantage that 50 per cent less produce is stored in the same space when using crates instead of bins. The cost of crates is also high when repairs and replacements are considered. In the past, turnips three feet or more from the outside of the pile eventually spoiled and rotted, and in time the whole pile would rot or develop pithiness of the roots, or sprout excessively. In this experiment a blower enabled the pile to be aerated in such a way that the roots on the inside were at a temperature similar to those on the outside. The turnips were pronounced, at the end of the experiment to be in perfect marketing condition, indicating the feasibility of storing root crops in large piles. The need for further detailed work is emphasized.—T.D.H.

Comin, D., and Junnila, W. **Water loss from vegetables in storage.** *Bi-m. Bull. Ohio agric. Exp. Sta.* **31.** 159-66. 1946. **973**

The experiments reported indicate that one effective method of reducing moisture loss from vegetables is to cover them or place them in closed, but not sealed, containers. This procedure confines the transpired moisture and thus tends to maintain a near-saturated atmosphere about the vegetables. This method is especially applicable to dry-atmosphere storage rooms and is not necessarily recommended for storages in which the relative humidity is maintained at 90 per cent or above.

Underground storages are ideal for the storage of most root crops. Moisture is much more important than temperature in the storage of these crops, particularly when sprouting may be controlled by artificial means. However, the temperature of the storage should be maintained as low as the costs of cooling will allow.

In the storage of vegetables, the vapour pressure deficit is responsible for the rate of transpiration. Both relative humidity and temperature affect vapour pressure of the air within the intercellular spaces of the vegetable tissues and of the air surrounding the vegetables. Vapour pressures are higher the higher the temperature. For this reason, until the vegetables reach the same temperature as the surrounding storage air, they transpire rapidly. Naturally, the weight losses of vegetables is most rapid just after they are placed in cool storage.—Extract.

Glendenning, R., and Fulton, H. G. **Experiments in control of the Carrot Rust Fly** (*Psila rosae* **L.**) *Sci. Agric.* **28.** 545-53. 1948. [Dom. Entom. Lab., British Columbia] **974**

In experimental plots complete control of the first and second generations of the fly was obtained by spring application of benzene hexachloride (20 per cent dust in gypsum, partly deodorized and diluted from the original 2 per cent gamma content to give a 0.5 per cent gamma dust). The rate of application was 1 lb. gamma isomer per acre per application. There was some control also of the third generation of the fly. Foliage and ground surface treatments gave satisfactory freedom from tainting in the carrots while soil incorporation resulted in both tainting and direct injury by the chemical.

Independent tests for taint in raw and cooked carrots confirmed that tainting occurs only when the benezne hexachloride is incorporated in the soil.—K.J.S.

DRUMMOND-GONÇALVES, R. Bacteriose da mandioca. [**Bacteriosis of cassava** (*Manihot*).] *Biologico* **14.** 145-6. 1948. [Div. Biol. Veg., Inst. Biol., São Paulo, Brazil] **975**

The symptoms of the disease caused by *Phytomonas manihotis* are described. Plants affected are often attacked by secondary parasites, especially fungi of the genera *Gloeosporium* and *Fusarium* The varieties Branca de Santa Catarina, Areal, Brava de Itú, common Vassourinha and Guaxupé have proved resistant in trials. Diseased plants should be rogued, and land on which the disease has broken out should not be used for cassava for 4 or 5 years.—G.M.R.

ASHBY, E. **Studies in the morphogenesis of leaves. II. The area, cell size and cell number of leaves of *Ipomoea* in relation to their position on the shoot.** *New Phytol.* **47.** 177-95. 1948. **976**

Data show that there are significant gradations in area, cell size and cell number from leaf to leaf up the shoot, that leaf area and cell number are significantly affected by water supply but cell size is not affected; in these characters leaves 11, 12 . . . respond to the removal of 3 young leaves below them. It is suggested therefore that the gradients between successive leaves are not the result of competition for water among adult leaves on the shoot but are related to the influence of immature leaves on still younger leaves developing above them. The influence may operate (1) through the upward diffusion of substances which inhibit cell division and expansion in still younger leaves, or (2) through the interception by immature leaves of substances which promote cell division and expansion in still younger leaves.—K.J.S.

CROP BOTANY

PRAT, H. **Histo-physiological gradients and plant organogenesis.** *Bot. Rev.* **14.** 603-43. 1948. [Bot. Inst., Univ. Montreal] **977**

A gradient is the progressive variation of a factor in function of the position. The concept is applied to plants, and in this review the gradients are grouped in three classes: physico-chemical gradients (chemical, ionic, electric, oxidation-reduction, hydration, osmotic pressure and suction); physiological gradients (metabolism, sensitivity to heat and desiccation, resistance against parasite organisms); auxetic gradients (growth and development, polarized cell senescence, mitotic, maturation, elongation and biometric gradients.—D.B.

ASHBY, E. **Leaf shape and physiological age.** *Endeavour* **8.** 18-25. 1949. [University, Oxford Rd., Manchester] **978**

The change in shape of leaves on a stem raises problems which include: (1) effect of local differences in cell division and growth; (2) the chemical and physical background to these local differences; (3) the mechanism by which environment affects leaf shape; and (4) the relation, if any, of leaf shape to maturity or physiological age.

In discussing the two last aspects the author concludes that there is no adequate theoretical basis for Krenke's hypothesis (*Herb. Abstr.* 15. Abs. 1106.).—M.H.

VIRTANEN, A. I., and HAUSEN, Synnöve Saubert v. **Role of substances formed during germination in the growth of plants.** *Nature, Lond.* **163.** 482-3. 1949. [Biochem. Inst., Helsinki] **979**

The mode of action of vitamin C as a growth hormone in plants has been studied in tests with wheat and the pea plant. There is indication that the vitamin's effect is based on its reducing properties. Regulation of the redox potential is apparently the important function. Apparently also the plant needs substances formed in the seeds during germination, often for a long time after the development of the first green leaves. This period varies in different plants.

The prevailing concept that immediately after the appearance of chlorophyll the plant forms all its organic material through assimilation of CO_2 is thus not confirmed. The data suggest that productiveness of different varieties of the same plant may depend on the quantity of substances formed in the seed during germination.

" Later experiments have confirmed the view that the reducing properties of vitamin C are of high significance. In addition to vitamin C many other substances, such as reductone, cysteine, and glutathione in suitable concentrations promote growth in nutrient solutions with nitrate as the source of nitrogen. With ammonium salts these reducing substances are either ineffective or, in somewhat higher concentrations, injurious. Our measurements have also shown that vitamin C as well as other reducing substances added to the substrate lower the redox potential within the plant."—M.H.

BARTON, Lela V., and SOLT, Marie L. **Growth inhibitors in seeds.** *Contr. Boyce Thompson Inst.* **15.** 259-78. 1948. **980**

The experiment was undertaken to determine whether dormancy is correlated with the presence of growth inhibitors in seeds, wheat roots being used as the sensitive test object. The effect on primary root growth of wheat seedlings of extracts of seeds of *Lactuca sativa*, *Sorbus aucuparia*, *Berberis thunbergii*, *Phaseolus*, wheat, barley, *Glycine* spp., *Solanum melongena* and *Nicotiana tabacum* was examined under different pre-treatment of the seeds before extracting and with different concentrations of extract.

There may be an indication in some cases that dormancy is possibly connected with the presence of growth inhibitors, but from the results obtained it appears that dormancy is not imposed, solely, by the presence of a water soluble substance deleterious to wheat root growth in solution. This does not preclude the possibility of a substance not soluble in water or of another type of substance causing failure to germinate.—T.D.H.

CROP PHYSIOLOGY

Chilean Nitrate Educational Bureau, Inc. **Bibliography of the literature on the minor elements and their relation to plant and animal nutrition. Fourth edition. Vol. 1.** 28 × 22. pp. 1037. New York: Chilean Nitrate Educational Bureau, Inc., 120 Broadway, New York 5, N.Y. 1948. **981**

Wilson, R. D., and Waring, E. J. **Some observations and experiments concerning the role of molybdenum in the nutrition of the flowering plant.** *J. Aust. Inst. agric. Sci.* **14.** 141-5. 1948. **982**

The element molybdenum, though required in only trace amounts, is apparently essential for the growing of some, possibly all, green plants. It was known that large applications of nitrogenous fertilizers tended to induce a greater amount of whiptail in cauliflower crops, and it was suspected that the role of molybdenum in relation to whiptail might be concerned with the reduction of nitrates in the plant. There is an intervenal chlorosis of cauliflower leaves which is thought to be an early stage of the whiptail disease, and when such cauliflower leaves were tested for the presence of nitrates with diphenylamine-sulphuric acid they gave a strong positive reaction.

Treatment of the leaves showing this intervenal chlorosis with sodium molybdate or ammonium molybdate has resulted in the disappearance of the oxidising materials from the intervenal areas within 2.5 to 5 days. This disappearance has been followed by the formation of a healthy dark green colour in about 5 to 7 days.

It has also been noticed that neither intervenal chlorosis or whiptail develops in plants which, in the early stages of growth, have been supplied with sodium molybdate or ammonium molybdate. It would therefore appear that molybdenum acts as a catalyst in the reduction processes of the cauliflower plant, probably in the reduction of nitrates.—J.T.B.

Dean, L. A., Nelson, W. L., Mackenzie, A. J., Armiger, W. H., and Hill, W. L. **Application of radioactive tracer technique to studies of phosphatic fertilizer utilization by crops: I. greenhouse experiments.** *Proc. Soil Sci. Soc. Amer.* **12.** 107-12. 1947. [Bur. of Plant Ind., Soils and Agric. Engng., U. S. Dept. Agric., and N. Carolina A.E.S., Raleigh, N.C.) **983**

P^{32} is used as a tracer to distinguish phosphorus absorbed by the plant from applied fertilizer, from that absorbed from the native soil phosphorus content. The higher the native phosphorus content of the soil the less is absorbed from the phosphorus supplied in fertilizers. Type of fertilizer, rate of application and placement all effect the relative amounts of native and fertilizer phosphorus, absorbed by plants. Factors influencing growth do not necessarily affect the percentage of phosphorus in the crop that is derived from the fertilizer applied at planting.—T.D.H.

Nelson, W. L., Krantz, B. A., Colwell, W. E., Woltz, W. G., Hawkins, A., Dean, L. A., Mackenzie, A. J., and Rubins, E. J. **Application of radioactive tracer technique to studies of phosphatic fertilizer utilization by crops: II Field experiments.** *Proc. Soil Sci. Soc. Amer.* **12.** 113-8. 1947. [North Carolina and Maine A.E.S., and Divn Soil Management and Irrign U. S. Dept. Agric.] **984**

Phosphorus absorbed by the plant from the added superphosphate fertilizer was distinguished from that absorbed from the soil reserve by the fact that the former was labelled with P^{32}. Potatoes, corn, cotton and tobacco absorbed different amounts of fertilizer phosphorus even in soils of comparable native phosphorus content. Potatoes absorb large amounts from the fertilizer throughout the growing season while corn absorbs proportions in the later stages of the growing period. As the native soil content of phosphorus increases the amounts of fertilizer phosphorus absorbed decreases. In general, there was a relatively uniform distribution of P^{32} within the plants.—T.D.H.

Stout, P. R., Overstreet, R., Jacobson, L., and Ulrich, A. **Symposium on "The use of radioactive isotopes in soil and fertilizer investigations." (Joint program of Sections II and IV of the Soil Science Society and Section II of the Crops Science Division, American Society of Agronomy) The use of radioactive tracers in plant nutrition studies.** *Proc. Soil Sci. Soc. Amer.* **12.** 91-7. 1947. **985**

In reviewing the applications of radioactive isotopes to studies in soils and plant nutrition, examples of several types of applications have been taken from work done in the Divisions of Soils and Plant Nutrition at the University of California.

Methods of detection and their level of sensitivity are discussed. General topics illustrated with experimental work are the following: (a) direct tracing of gross transport of salts in living systems; (b) general applications of "tracer chemistry"; (c) autographic techniques; (d) micronutrient element studies with radioisotopes of high specific activity; (e) application to fertilizer studies; (f) exchange reactions; (g) special role of radioactive carbon in plant and soil studies; and (g) studies with fission products.

The work discussed involved the use of 19 different radioelements. Of these elements, N.C.P. S,K, and Zn are physiologically required elements for the growth and development of plants. Na, Rb, Cs, Sr, Br, and I have been used as analogues of important ionic types of importance to plant and soil chemistry, and Y, Ce, Cb, Te, Zr, and Pu have been investigated as fission products.—Authors' Summary.

REES, W. J. **The salt relations of plant tissues. IV. Some observations on the effect of the preparation of storage tissue on its subsequent absorption of manganese chloride.** *Ann. Bot., Lond.* **13.** (N.S.) 29-51. 1949. [Bot. Dept., Univ. Birmingham] **986**

In absorption of salt experiments by plant tissues, discs are frequently used, necessitating the washing of the discs after cutting to remove electrolytes adhering to the broken cell walls. These experiments aim at determining the effect of the numerous variable factors at work during this washing on the subsequent ion intake by the tissue. The plant materials used were red beetroot, artichoke, and parsnip. Apart from the artichoke tissue, uptake was favoured by prolonged washing. Though washing with air-free water favours absorption, it does not do so to the same extent as aerated water. N_2 and O_2 both favour absorption by red beet tissue, the latter to a greater extent than the former. Temperature also has a considerable effect on absorption, and the author emphasizes the use of controlled conditions in tissue preparation, especially during washing, which he suggests should be carried out at a temperature which will eliminate the peak of respiratory activity as soon as possible after cutting without damaging the tissue and for which purpose temperatures in the neighbourhood of 20°C are proposed.—T.D.H.

WEINTRAUB, R. L., and PRICE, L. **Inhibition of plant growth by emanations from oils, varnishes and woods.** Smithson. misc. Coll. Vol. 107. No. 17. pp. 13. 1948. **987**

Air in contact with certain oils, varnishes, and woods was found to acquire the property of inhibiting or markedly retarding the germination of oats, wheat and corn, and also, to a less pronounced degree sorghum, barley, tomato, bean, lettuce, and radish. The inhibition or retardation ceased completely on removal of the seeds from the affected air. As the active agent could be transferred in an air stream from one container to another, it is considered to be of the nature of a chemical vapour rather than some form of radiant energy.—Authors' summary.

EKSTRAND, H. Nagra växtpatologiska synpunkter pa övervintringen av höstsäd och vallgras. [**Some phytopathological views of the overwintering of winter cereals and forage grasses with special regard to the experimental work in agriculture.**] 1947. pp. 48. [English summary, 43-6.] **988**

CROP BIOCHEMISTRY

STENBERG, M., EKMAN, P., LUNDBLAD, K., and SVANBERG, O. Om kopparhalt i jord och vegetation och resultat av fleråriga gödslingsförsök i koppar. [**The copper content of soils and crops and the results of long-term fertilizing experiments with copper.**] *K. LantbrAkad. Vetensk.* No. 4. [English summary, pp. 99-105] pp. 106. 1949. **989**

Experiments on copper-deficient soils at the experimental farms of Gisselås and Brännberg in Northern Sweden show that the copper content of the crops on plots receiving no copper can vary greatly from year to year, for example, from 1.4 to 5 ppm Cu in the dry matter.

Hay analyses show that copper deficiency occurs in Norrland except in the coastal and mountain districts. In the central part of the country (Svealand) a low copper status in the crops occurs only on some peaty and a few sandy soils. In the south (Götaland) there is a large copper deficient area in the provinces of Kronoberg, Blekinge, and Kristianstad. A number of samples from the provinces of Halland, Jönköping and Skardborg, and the islands of Gotland and Oland in the Baltic also show low copper content.

It was found that the mean copper content of the vegetation increases very rapidly with increasing copper content of the soil up to a soil value of 20 kg. per ha. Above this point the increase is rather slow. At a soil value of 15 to 20 kg. the copper content of the vegetation is generally about normal.

Long-term experiments on grassland in which copper was applied as a top dressing in the first year show considerable time lag in the effect on the copper content of the crops. Thus sulphate of copper applied as a top dressing may show little effect for two or three years, and sometimes even longer. Six years after top-dressing grassland with copper sulphate at Gissclås, which is a humid region, practically all the copper added was recovered from the top 5 cm. of soil. The only effective means of obtaining immediate and definite results in a one-year experiment is to plough in the copper.

On the basis of copper contents of the soils and the observed relationship between copper in the soil and crop, it is estimated that about 40 kg. copper sulphate per hectare would be a suitable and reliable rate of application.

Fertilizing with copper has little effect on the yield of hay but improves its quality.

In regard to cereal crops the copper content of grain from Cu-deficient soils is low, and as a rule fertilizing with Cu results in higher values. But when there is a great increase in the yield of grain the increase in copper content vanishes and may even become a decrease.

The authors consider that soil analyses especially in combination with field experiments constitute the best method for assessing copper requirements.

To remedy copper deficiency an application of from 25 to 40 kg. copper sulphate per hectare is generally adequate. It is important that it should be well incorporated with the soil by ploughing in. Such a dressing should be sufficient for many years.

Where the fodder is deficient in Cu the feeding of phosphate supplements with 0.5 to 1.0 per cent copper sulphate added is an important measure in preventing losses in cattle during winter feeding in Sweden. As a general principle in animal husbandry, it is preferable to maintain a satisfactory Cu status in the soils and thereby minimize the necessity for supplying it in mineral supplements.—R.P.J.

MORGAN, N. D. **Starved plants show their hunger.** *Better Crops with Plant Food* **32.** 6-10 and 44-6. 1948. **990**

Visual symptoms indicating deficiency of major plant nutrients, manganese, magnesium and boron are given for maize, leguminous and vegetable crops.—K.J.S.

ATTOE, O. J. **Rapid photometric determination of potassium and sodium in plant tissue.** *Proc. Soil Sci. Soc. Amer.* **12.** 131-4. 1947. [Dept. of Soils, Univ. of Wisconsin] **991**

Samples of various plant tissues were ground, sieved, extracted with a solution of ammonium and magnesium acetates (2N with respect to ammonium acetate and 0.2N with respect to magnesium acetate), and filtered. The flame photometer is standardized with standard solutions containing 10, 20, 50 or 100 ppm. of K or Na. Readings for the extracts are obtained through the use of the instrument's ratio dial. The dial readings are translated into concentrations in ppm. of K and Na by plotting a graph using the readings from the standard solutions and then reading the extract concentrations off from this graph. It was found that K and Na exist entirely in water soluble and exchangeable forms in plant tissues. The accuracy of this method is considered, the method being found simple, rapid and accurate.—T.D.H.

DEXTER, S. T. **An oil distillation method for determining the moisture content of farm crops.** *Quart. Bull. Mich. agric. Exp. Sta.* **31.** 248-53. 1948. [Mich. Agric. Exp. Sta.] **992**

The material is heated to 145°C in a bath of surrounding vegetable oil to distil off its moisture, and the loss in weight determined with an accurate spring balance. For simplicity the balance scale is adjusted to read zero when the pan of the scales is carrying the container, cover, screen, thermometer and oil used in the test. The time to heat 100 grm. hay sample is about 10 mins; about 20 mins. is required for coarser material.—K.J.S

HENRY, T. A. **The plant alkaloids.** 24 × 16. pp. xxiii + 804. London: J. and A. Churchill, Ltd., 104 Gloucester Place, W.1. 1949. (4th ed.) 63s. **993**

We merely note the appearance of the fourth edition of this monumental work published in first edition in 1913. The author states that so much additional information has accumulated since the last edition in 1939 that the preparation of a new edition has involved rewriting a large part of the volume and adding considerably to its bulk. It is impossible for a reviewer to say more than that it is an essential reference book for all working on the chemistry of the plant alkaloids, and to the less extent on the symptoms produced on animals ingesting plant material containing alkaloids.—R. O. Whyte.

TANG, Y. W., and BONNER, J. **The enzymatic inactivation of indole acetic acid. II. The physiology of the enzyme.** *Amer. J. Bot.* **35.** 570-8. 1948. [Calif. Inst. Technology, Pasadena] **994**

Etiolated pea seedlings contain an enzyme which inactivates indole acetic acid (IAA). In both etiolated and green peas there is also a water soluble, thermostable factor which inhibits the enzymatic inactivation of IAA. Light promotes the formation of the inhibitory factor. The inhibitor was found in all plant tissues investigated. The reaction between the substrate, inactivating enzyme and inhibitor is non-competitive. The IAA-inactivating enzyme occurs not only in etiolated tissues of peas but also in *Avena* and in roots. Green leaves of plants thus far used do not contain the active enzyme. Etiolated leaves such as those of cabbage contain the enzyme. The IAA-inactivating enzyme cannot be obtained from dormant pea seeds but the cotyledons of germinated pea seedlings contain the active enzyme. Exposure to light diminishes the content of the IAA-inactivating enzyme of etiolated pea seedlings. The longer the exposure to light the less the amount of the active enzyme found in the plant. The enzymatic inactivation of IAA takes place not only *in vitro* but also *in vivo* as judged by the inactivation of infiltrated IAA.—Authors' summary.

ENVIRONMENTAL STUDIES

MELCHERS, G., and LANG, A. Die Physiologie der Blütenbildung. **[The physiology of flowering.]** *Biologischen Zentralblatt* **67.** 105-174. 1948. [Kaiser Wilhelm Inst. für Biologie, Tübingen, Germany] **995**

The paper reviews present knowledge of the causes of the transition from vegetative to reproductive development. Vernalization, photoperiodism, flowering hormones, the interaction between these phenomena and the theory of phasic development of plants are discussed. A complete review of the literature has not been attempted.—D.B.

LANG, A. and MELCHERS, G. Vernalisation und Devernalisation bei einer zweijahrigen Pflanze. **[Vernalization and devernalization in a biennial plant.]** *Z. Naturf.* 2b. 444-9. 1947. [Kaiser-Wilhelm Inst. für Biologie, Tübingen, Germany] **996**

Based on results of experiments with *Hyocyamus niger* theories are advanced regarding the " cold requirement " of biennials and winter annuals. The requirement is in many respects similar in each.—D.B.

BONNER, J. and BONNER, D. **Note on induction of flowering in** *Xanthium*. *Bot. Gaz.* **110.** 154-6. 1948. [Calif. Inst. Technology, Pacadena (J.B.) and Osborn Bot. Lab., Yale Univ. (D.B.] **997**

A water extract and an ether extract of the growing point of the palm *Washingtonia robusta* were applied to *Xanthium canadense* (a short-day plant) kept under vegetative conditions under a day-length of 20 hr. The solutions were absorbed through a 5 cm.-long stem flap situated 10 cm. from the apical bud. Of the sixty-eight plants tested, fifty-eight formed flower primordia. Control plants, treated with water alone, remained vegetative. The experiment was carried out 10 years ago. The results were not obtained again when the experiment was repeated with *W. robusta*, *W. filifera* or with *Phoenix canarensis*. The experiment is recorded now because extracts of another monocotyledonous plant, *Zea mays*, have been reported to be effective in inducing flowering.—D.B.

CATCHESIDE, D. G. **Genetic effects of radiations.** *Advanc. Genet.* **2.** 271-358. 1948. [Botany School, Cambridge Univ.). **998**

The nature, properties and effects of radiations are discussed in relation to the cytology and genetics of plants and animals. (See also *Plant Breeding Abstracts*).—T.D.H.

PEGLION, V. Siccità ed insolazione. Riflessi fisiopatologici su alcuni prodotti nella campagna 1946-47. **[Drought and insolation. Physiopathologic reflections on some crops in the 1946-47 season]** *Ital. agric.* **85.** 69-75. 1948. **999**

The depressive action on crop yields of drought and excess of insolation is reviewed, particularly in regard to summer of 1947. Wheat, rice and sugar productions of that year were lower than expected. Wheat suffered from premature ripening. In sugar beet high temperature and insolation caused scalds on the leaves, assimilating activity was reduced or inhibited during 45 days, and damage caused by *Cercospora beticola* increased (for the control of this disease in Italy resistant varieties had been introduced). In some zones withering of beet, caused by dry rottenness of the collar, was being attributed to boron deficiency. Also rice, grown under irrigation, is thought to have suffered from excessive insolation.—E.B.

PRESCOTT, J. A. **Australia's special interest in plant introduction.** *J. Aust. Inst. agric. Sci.* **14.** 102-3. 1948. **1000**

When Australia was first discovered and later colonized no plants or animals of economic importance apart from the native trees and grasses were present in the country. The early settlers tried the more familiar plants of temperate and tropical regions. As the climate became more thoroughly understood more attention was given to local types such as wheats from North Africa.

That the field for introduction even from the temperate and subtropical regions is not exhausted is illustrated by recent experience with flax and linseed, safflower and rye while the possibilities for tropical introductions are still very considerable. The new outlook should be experiments with breeding material, and physiological work on the growth responses of plants to temperature, so that new varieties appropriate to the local Australian environment may be developed. The climatological conditions and edaphic factors must also be considered in this process of plant introduction.—J.T.B.

KLINKOWSKI, M. Kulturpflanzenreiche entstehen und vergehen. **[Areas of cultivated plants, their origin and disappearance.]** *Urania* **10.** 209-16. 1947. [Aschersleben, Germany] **1001**

An account of the origin and spread of crop plants. A map shows the gene centres of cultivated plants to be south-west Asia, south-east Asia (China) the lands round the Mediterranean coast, eastern Africa (Abyssinia, Kenya, Tanganyika and Rhodesia), Mexico, and in S. America a region which includes Columbia, Ecuador and Peru. Maps show the migration of potatoes, lucerne, serradella, lupin, and peas and related plants.—D.B.

BARGER, G. L. and THOM, H. C. S. **A method of characterizing drought intensity in Iowa.** *Agron. J.* **41.** 13-9. 1949. [Iowa Agric. Expt. Sta.] **1002**

A dry period has been defined as terminating at that time just prior to any 48-hour period during which at least 0.1 in. of rain fell. This definition has little agricultural significance as the occurrence of 0.1 in. of rain does not appreciably alter the soil moisture conditions. This present investigation analyses corn yields for the last fifty years, correlating six different soil areas. The criterion of drought intensity arrived at is based on the association of certain minimum required total amounts of rainfall with varying durations of time, i.e., the amount of rainfall just permitting normal corn development during a period of *n* consecutive weeks is the minimum required total rainfall for that duration. These minimum amounts increase parabolically, rather than linearly, with duration and differ considerably over different soils. The maximum rainfall deficiency in relation to these base amounts during the growing season gives a measure of drought effect on the final crop yield. For years in which drought conditions occurred, from 25 to 60 per cent of the total variation in corn yield is attributable to rainfall deficit.—T.D.H.

SISSINGH, G. Klimaatsverschillen in Nederland en hun invloed op de vegetatie. [**Climatic differences in the Netherlands and their effect upon the vegetation.**] *Ned. kruidk. Arch.* **56.** 31-8. 1949. [Gorssel, Netherlands] **1003**

Paper presented to a meeting of the Netherlands Botanical Association, April 1944. Two broad divisions of the Netherlands are recognized, the Atlantic west, warmed by the Gulf Stream, and the continental east. Five climatic periods are distinguished, namely, (1) winter, Dec.-Feb., a relatively dry period; (2) spring, March-April, generally still drier; (3) summer or Atlantic dry season, May-July, with more rain in the east, but rainfall minima in the islands and on the coast; (4) August, rainfall 60 to 100 mm., highest in the north; (5) autumn or Atlantic rainy season, Sept.-Nov., rainfall varies greatly but is high, especially on the coast. The effect of geographic latitude is felt from north to south. A broad outline is given of the natural plant cover as governed by these climatic conditions. The effect of climate is felt also in the weed growth of arable land, although here the influence of the microclimate, which is governed principally by the kind of soil, outweighs that of the general climate. This is expressed in the presence in the heavier loam and clay lands of Mediterranean-Atlantic weed associations such as Mercurialetum and Veroniceto-Lamietum, while in the sand soils, especially of the south-east, the more continental Echinochloeto-Setarietum is found. Further north it is too cold for the seed of the characteristic grasses to ripen and the proportion of *Setaria* spp. and *Digitaria ischaemum* is greatly reduced. In the sands of the Wadden islands the association is replaced by the Atlantic Chrysanthemo-sperguletum.—G.M.R.

SANDERSON, Marie. **The climates of Canada according to the new Thornthwaite classification.** *Sci. Agric.* **28.** 501-17. 1948. [Ontario Research Foundation] **1004**

Thornthwaite's new system is based on the recognition that precipitation must be compared with water need or potential evapotranspiration, which terms are defined. It presents a method of determining water need quantitatively and of computing actual evapotranspiration, water surplus and water deficiency. The new classification follows from the relationship between water surplus and water deficiency and is the first to be based on climatic data without reference to vegetation and soils.

The system is illustrated by 9 maps and figures for Canada.—K.J.S.

CONWAY, V. M. **Von Post's work on climatic rhythms.** *New Phytol.* **47.** 220-37. 1948. **1005**

Features of von Post's work are (1) the idea of an upswing of climatic conditions to an optimum after the last glaciation with subsequent deterioration, (2) the detailed analysis of pollen curves and of peat stratigraphy to reveal the story of small-scale fluctuations and (3) the idea that it may be possible to interpret climatic fluctuations in general terms of various rhythmic oscillations. In the present paper the last idea is stated in the form of a broadly generalized hypothesis; this is to be used as a basis for suggesting ways of accumulating useful data.—K.J.S.

BOOKS AND PERIODICALS

Franklin, T. B. **A history of agriculture.** 19 × 13. pp. 246. London: G. Bell and Son, Ltd. 1948. 10s. 6d. **1006**

The author tells the story of the development of our agriculture in a way which will appeal to all sections of the farm community. A book to put in the pocket for the next long train journey.

I wonder how many readers are aware that it is possible to see the remains of Celtic corn fields on the Yorkshire Wolds, or that the open-field system is still practised in Nottinghamshire and in Lewis?

The main study is introduced and developed from a brief survey of the agricultural systems and implements of the Near East in Biblical times. It may be asked whether this is the reason why the title of the book is not "a history of British agriculture." Our earliest cornfields were small, circular and surrounded by stone walls, the Celtic farms, however, had small rectangular fields, while the Anglo-Saxons who succeeded the Romans favoured large open fields.

It is interesting to note the working out of cause and effect in the case of the Manorial System, the wool trade, inclosures, land reclamation, etc., and the rapid development of the new husbandry (plant and animal) in the eighteenth and nineteenth centuries.

The operation of land inclosure is illustrated for the Parish of Cosgrove, where Richard Francklyn a forebear of the author, bought Hisworth farm in 1616, following the cancellation of his lease. Hisworth farm also had claim to 96 strips under open field cultivation, which varied in size from 19 poles to just over 3 acres. The consolidation of the farm by exchange and its extension by purchase are related to the social history of the period.

In Britain between 1760 and 1840 over 2500 parishes were enclosed. Leicestershire was almost entirely enclosed by 1790 and William Marshall writing about this time states "Leicestershire, not long ago was an open arable country, now a continuous sheet of green sward. A district of grazing grounds."

The author rightly stresses the inter-relationship between the industrial and agrarian revolutions. The latter was also greatly accelerated by the application of scientific and engineering developments to agriculture.

The final chapters deal with the "Golden Age" of farming, grass replacing corn, the war of 1914-18, grass becomes Britain's largest crop, progress by science invention and happy accident, the second World War and mechanisation, the farmers' animals, and finally farming sayings.

There is a short bibliography of modern authors and a useful index. The book is well produced and contains numerous illustrations. The price, half a guinea, may prevent this history becoming as well known as it deserves.—A. R. Beddows.

Wood, G. L. (Editor). **Australia, its resources and development.** 22 × 14. pp. xviii + 334. New York: The Macmillan Company 1947. **1007**

This book, published in America is intended to give American readers an over-all picture of the natural resources and present state of their development in the Australian continent. It must necessarily tend to be somewhat superficial and popular in dealing with all aspects from the climate and original peopling of Australia, its soils and agriculture, to mineral resources, hydro-electric powers, and wages and living standards. The chapters relevant to this abstracting journal are:

The soils of Australia, by G. W. Leeper.
Pasture and fodder resources, by J. Griffiths Davies and C. S. Christian.
The development and present limitations of the Australian sheep industry, by H. R. Marston.
The place of wool in the Australian economy, by I. C. Ross.
The cattle industry, by R. B. Kelley.
The Australian wheat industry, by W. S. Kelly.
Difficulties of small-scale farming in Australia, by S. M. Wadham.
Water conservation and irrigation, by L. R. East.

[See also Abs. numbers, 748, 753, 808.]—R. O. Whyte.

REPORTS

SWITZERLAND. Federal Agricultural Research Station, Zürich-Oerlikon. Bericht über die Tätigkeit der Eidg. landwirtschaftlichen Versuchsanstalt Zürich-Oerlikon pro 1946/47. [Report of activities of the Federal Agricultural Research Station for 1946/47.] By *R. Koblet. Landw. Jb. Schweiz* Vol. 5, pp. 405-70. 1948. **1008**

Seed Testing. Hemp, flax, peas, beans, garden beet, sugar beet, mangolds, wheat, rye, oats and barley are among the seeds tested for purity and germinability.

Breeding. The acreage for experimental work on bread grain increased. These cereals include rye, wheat, spelt wheat, summer wheat and maize. Breeding of Fellerser wheat, which is exclusively for mountainous country, is so far advanced that it has reached the increase stage. Progress in other cereal crossings is reported. Maize breeding has proceeded as far as crossing of inbred lines of maize. The large supplies of different maize varieties and hybrids particularly from America have led to requests for tests of its suitability for silage.

Plant Protection. The dry warm weather of 1947 was favourable to the development of many plant diseases which otherwise would have remained unimportant; especially does this apply to the various mildews. A brief account is given of the diseases which attacked cereals, potatoes, garden beet, sugar beet, maize, rape and poppy. The value of insecticides and fungicides was studied.—D.B.

NETHERLANDS. The Central Bureau (Nationale Coöperatieve Aan- en Verkoopvereniging voor de Landbouw "Centraal Bureau" G.A.), Rotterdam. Annual report, 1947-1948. pp. 30. **1009**

The above-named report is an extract, written in English, French and German, from the full annual report. The organization concerned, which is generally known as "The Central Bureau," is an Association open to Co-operative Societies only, the present membership being over 400. It was founded in 1899 with the initial intention of being a purchasing office only, but its activities now include the maintenance of an animal nutrition research station at Hoogland and a plant breeding station at Hoofddorp, and the reproduction of seed on a farm at Harscamp, as well as the provision of legal assistance for the member Societies; the construction, equipment and maintenance of agricultural buildings and machinery including electric plant; and the purchase of fertilizers, fuel, feeding stuffs, disinfectants weedkillers, etc.

An important part of the plant breeding work is concerned with the breeding of winter wheat, grasses and clovers for resistance to cold. There was a considerable shortage of all types of seed in the year under review.—G.M.R.

NEWS ITEMS AND SCIENTIFIC NOTES

Great Britain

Open-Cast Mining **1010**

The Minister of Fuel and Power replying to questions in the House of Commons, asking him to reconsider the practice of requisitioning agricultural land because of the need for home-grown food, said the value of coal extracted by open cast mining was in the main far greater than that of food. A Ministry of Agriculture representative expressed the view that it was impossible to restore the surface soil after the coal had been extracted. The soil and subsoil were not properly stacked and the activity of the weather washed away much of the valuable humus and mineral salts. For the Ministry, the Parliamentary Secretary said hat the ripping of agricultural land to obtain coal was only orced upon them in the urgency of the situation and before his was done all the departments consulted together to preserve as much land as possible for the farmer.—*Fmr's Wkly* 4th Feb. 1949.—K.O.

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nternational Protection of new varieties **1011**

A meeting was held in London on February 15, 1949, nder the joint auspices of the Seed Trade Association of the United Kingdom, Inc., and the National Association of Corn and Agricultural Merchants, Ltd., to meet M. Ernest Tourneur, President of Ass. In. Sel. (Association Internationale des Sélectionneurs Professionnels pour la Protection des Obtentions Végétales)

The Chairman, Mr. A. L. Deal, introduced the visitor, who had been invited to give the meeting the benefit of his personal guidance on the implications and general working of his Association. Meetings had been held both by N.A.C.A.M. and S.T.A. in the past in order to endeavour to evolve some means of adopting the recommendations and conditions of "Assinsel" in respect of Great Britain, bearing in mind the lack of protection afforded by British copyright laws, but without a fuller knowledge of all that was involved, the difficulties had appeared to be insurmountable. Two or three Conferences had been held on the Continent under the auspices of "Assinsel" in order to interest the breeders and producers of the various strains of seeds in all countries and arrive at some means of protection in the introduction and raising of new strains, and M. Tourneur was invited to report to the meeting on the outcome of these conferences. M. Tourneur explained that the idea of his visit first arose from the attendance of Mr. G. P. Quick of the Ministry of Agriculture and Fisheries, and Mr. F. R. Horne of the National Institute of Agricultural Botany at a Convention at Scheveningen, Holland.

M. Tourneur's chief purpose was to discuss "the methods by which the work and the financial risk undertaken by the raisers of new varieties could be protected. It was his opinion that anyone who had raised a new variety had done as much for his fellow-men as an artist, author or sculptor, and should accordingly be given the appropriate financial reward and protection, not only in his own country but internationally. He felt that the time had come when the matter had gone beyond political considerations and that all raisers of new varieties should include themselves in this international Association for the protection of their life's work and for the benefit of those who reproduce and put their strains on the international market. It was now some 10 or 11 years ago since the official bodies in France had begun to realise the importance of his proposals in respect of the protection and copyright of new varieties, and official France was now working very closely with the private firms, the raisers and others, to the benefit of all concerned, and he felt that what could be done in France ought to be done in other countries. M. Tourneur said that he had become so enthralled with his idea that he introduced it to the various Continental countries, Belgium, Czecho-Slovakia, Holland, Denmark and elsewhere, and the general acclamation that had been given to him and the enthusiastic support accorded to his idea had resulted in the formation of the international body known as "Assinsel". As his ideas became more generally understood in those countries, and particularly in Belgium, Holland, Scandinavia and Italy, he was soon making contacts with the higher officials of their Ministries of Agriculture and, in fact, the Ministries themselves, particularly in Italy, had taken a very personal interest in the "Assinsel" proposals. . . . It was fully appreciated that it was impossible for the same rules and regulations to be drawn up in every country and that there must be a certain amount of elasticity, the scheme being worked to suit the individual country concerned. In exporting a plant, obviously the rules and regulations laid down in the country concerned had to be borne in mind, and the form of the licence established on that basis. An endeavour was being made to draw up a scheme for the international regulation of royalties on all plants, not only on cereals, but including vegetables, herbage, potatoes, sugar beet and all others. No one country could produce a totality of these plants; different types would be produced in the various countries, but it was hoped that all would become completely international so that they could flow freely from country to country. It might so happen that in one country there would be a new strain of wheat, oats or barley, whereas in England or in some other country there might be a new strain of vegetables, clovers, sugar beet or potatoes, and it was the aim of "Assinsel" that the agriculture of all countries should benefit from those new strains. In France, for example, new strains of herbage seeds were needed to improve her pastures. Britain had been particularly successful in the raising of new strains of potatoes and these, in many varieties, had been taken up in France with great success and had become part and parcel of the list of potato varieties; some of them had been re-named, but in no case had the prestige and the work of the raisers of the English varieties been recompensed by the fact that France had found them so much to her advantage. M. Tourneur said that such a practice could be compared with stolen property.

M. Tourneur said that although he hoped one day to see an international exchange of knowledge and new strains, there was another angle which had to be considered. As an example he referred to an application, a year ago, by a group formed in Germany, to become members of "Assinsel." Bearing in mind the disaster wrought by the Germans during the war years, not only on the battlefields of France, but in Britain and elsewhere, he had been prompted to refuse the application. He would, however, be called upon at a meeting next Monday in Paris, in connection with "Assinsel," to make a serious decision in that respect, for he did not wish to exclude the contribution which the Germans might be able to offer in the way of strains and facilities.

It was the great hope of M. Tourneur that, as a result of his visit to this country and his explanation of "Assinsel," Great Britain would eventually become a section of the international group, particularly before the Germans. Thanks to his visit to England, he appreciated the entirely different set-up, particularly of the cereal seed trade in England, where stocks were multiplied and sold by thousands of corn merchants all over the country. It would be impossible to apply "Assinsel" to all the multiplications involved, but he thought it would be possible to devise a scheme between the actual breeder and the firm in England who bought the seed for multiplication and sale. He suggested that it would here be better to have a purely British Scheme, as opposed to the international scheme, for the moment, in order to put everybody on the same footing.

"Assinsel," at the moment, had regulations for cereals and potatoes, but in Paris next week they were to study more detailed regulations for vegetable and herbage seeds. The next Conference, in the summer, in Rome, would finalise the various arrangements and he could see no difficulty in settling down to an established order of things. He regarded the "Assinsel" regulations more as an indication than a definite obligation.

M. Tourneur hoped that, as a result of the present meeting, an inter-professional association of plant breeders, including all the different types of plants bred in this country, even flowers, would be formed, but in the meantime, he invited individual firms to join the "Assinsel" organisation. In becoming a member of the International organisation, Great Britain would draw even closer to France, to the benefit not only of the two countries but of the world as a whole."

A number of interesting points were brought out in the discussion, including the position of Institutions as producers of new strains, the names of countries already represented on "Assinsel", the application of the scheme to private cereal breeders and to firms producing sugar beet seed, the reaction of Aberystwyth strains of grasses and clovers to French conditions, the degree to which France was contemplating the introduction of these Welsh strains and running the risk of losing their own local strains, the control in France of merchants or societies which could sell seeds of cereals, the interest of New Zealand in "Assinsel", and so on.

In conclusion, the Chairman suggested that " the subject was far too difficult and contentious to allow of a resolution being passed at the present meeting, and he proposed, with the agreement of the meeting, to advise Monsieur Tourneur that, whilst fully sympathetic towards the ideals of " Assinsel," it was desirable for each of the different sections of the industry to call separate meetings of their respective committees in order completely to thrash out the entire matter, bearing in mind the differences in the Law of England as compared with that in other countries. The next step would be to call another meeting of all interested bodies some time in the summer to hear their considered views. Monsieur Tourneur, in his address, had given those present something tangible to think about, and a report would be made to him after the summer meeting."

International Congress of Biochemistry. 1012

The First International Congress of Biochemistry is to meet at Cambridge, England, from 19 to 25 August, 1949. The Congress is being organized in eleven sections for the reading of papers and discussions. Section II is Plant Biochemistry. Chairman: C. S. Hanes, Ph.D., F.R.S.; Secretary: Prof. T. A. Bennet-Clark, M.A., Ph.D.

There are to be Congress lectures and visits to research stations and laboratories. The Hon. Organizer is F. J. Griffin, 56 Victoria St., London, S.W.1.

International Congress of Crop Protection. 1013

The Second International Congress of Crop Protection took place in London from 21 to 28 July, 1949. The six sections comprised: 1. Insecticides; 2. Fungicides; 3. Plant Growth Regulators; 4. Toxicology of Crop Protection Substances; 5. Methods of Application; 6. Analytical Methods and Standardization. The Hon. Organizer, F. J. Griffith, 56 Victoria St., London, S.W.1.

Sweden

Oil Crop Cultivation 1014

Brinka-gården in Scania is to be used for experiments with oil crops under the directorship of H. Melchert, Svalöf. The estate comprises 320 tunnland: the soil is very uniform, and according to investigations by G. Ekström, Government geologist, particularly suitable for the purpose. Experimental work will be conducted in collaboration with the State agricultural experiments.—*Lantmannen* 11 Dec. 1948.—R.P.J.

Belgium

Agricultural College, Ghent 1015

An illustrated but undated booklet, entitled " 25-jarig Jubileum " and published on the occasion of the College's twenty-fifth anniversary celebrations [in 1948 ?], gives an account of this educational and research institute which serves the Flemish-speaking population of Belgium. Among more recent developments is the establishment of a National Centre for Grassland and Forage Crop Research, the results of whose work are published from time to time with other material in *Med. LandbHogesch. Gent.* The booklet contains also the address which was presented on the above named occasion by Prof. E. de Vries of the Agricultural College at Wageningen, the Netherlands, the subject being " Agriculture in the Benelux countries compared with agriculture overseas " (see Abs. 772).—G.M.R.

Seed Exchange. 1016

The State Botanical Garden, in vol. 19 of its Bulletin, offers seed in exchange. Further particulars may be obtained from this Bureau.—D.B.

France

Groundnut Scheme Criticism 1017

In " Revue de Botanique appliquée " Vol. 28, pp. 485-8, A Chevalier gives a summary of " Le plan de culture mécanisée de l'Arachide dans l'Est Africain anglais (situation en mai 1948) " by M. Rossin and P. Coleno, which is a report of an inspection on the Tanganyika groundnut cultivations. In a note, A. Chevalier raises a number of criticisms to the Groundnut scheme which, in his opinion, is comparable to the old forms of Colonial exploitation. He also believes that the first task would be to raise the standard of life and education of the native population, if a valuable and lasting agricultural progress is to be made.—E.B.

Seed Exchange 1018

Vilmorin Andrieux (Service Scientifique) Verrières-le-Buisson, Seine-et-Oise, offers on an exchange basis, seed harvested in the year 1947-48. The seeds are in their botanical and agronomic collections and include the following tetraploid species: *Brassica napus* (Colza de Mars), *Hordeum distichum* L. var. *nudum* L., *H. hexastichum* L. var. Albert, *Linum usitatissimum* L. var. " à grosses graines," *L. usitatissimum* L. var. " de Riga ", and *Sinapis alba* L. Particulars of genera and species offered and required may be obtained from this Bureau or from the above address. [Information received 1949]—D.B.

Italy

Two New Early Maize Varieties 1019

The Bologna Cereal Breeding Institute has obtained these two varieties through hybridation of old Italian varieties and a late Bulgarian variety. They are "Macario " (I.B 0.99) and " Merlino " (I.B 0.26). Both have small development, ear of medium size and of excellent quality, and yield well on dry, not very fertile soils.—*G. Agric. Domen.* Feb. 1949.—E.B.

New Silos at Naples 1020

On 30th January, 1949, the new silo, which takes the place of the one destroyed during the war, was inaugurated. It is formed of 211 cells, with a total capacity of about

42,000 tons of cereals. *G. Agric. Domen.* Feb., 1949.—E.B.

Wheat varieties for the Po plain 1021

Three new early wheat varieties have been selected by the Bologna Cereal Breeding Institute, through hybridization of the "Damiano" and a different variety. They are: " Fiorello ", " Funo " and "Fortunato." The "Fiorello" is resistant to rust, and in large cultivation has yielded higher than the most productive varieties usually grown. The other two varieties are highly resistant to rust and cold.—*G. Agric. Domen.* Feb. 1949.—E.B.

Rice Harvester 1022

Rice harvesting in Italy is done completely by hand. The S. A. Cantoni of Vercelli has now created the first machine for this purpose. As the adherence of the wheels on the soil is insufficient to move the mechanisms, the machine is provided with a motor of 4.5 H.P. The harvester can work 4000 sq. metres per hour. (This information is reported from " Macchine e motori agricoli " of April, 1948). *Ital. agric.* Sep., 1948.—E.B.

Lodi Grassland Experimental Station 1023

The work carried out by this station since its foundation in 1923 is briefly reviewed by its retired director, *M. Bresaola.* The work has dealt also with research on cereals: comparison trials between autumn wheats varieties of the " Stazione di Granicoltura " of Rieti and varieties of the " Istituto di Cerealicoltura" of Bologna; relation between volume and agronomic value of seed; best quantity of seed for sowing; ribbon sowing; manuring of autumn and spring wheats; spring sowing of autumn wheat; resistance of maize varieties to smut (*Ustilago maidis*); cultivation trials on soil covered with asphalted cardboards.

Suppl. to *Ann. Sper. agrar.* Vol. 2. No. 4. pp. 9-48. —E.B.

Spain

Request for Seed of Sorghum. 1024

The Director of the Government Agricultural Research Station for Galicia at La Coruña is anxious to obtain seeds of *Sorghum* varieties suitable for trial in the north of Spain. The climate is maritime, with a mean annual temperature of 14°C. Rainfall, which is distributed throughout the year with winter rains predominant, ranges from 800 to 1600 mm. annually. For a note on previous *Sorghum* trials at this Station see *Herbage Abstracts* Vol. 17 Abs. 1054.

Correspondents who are in a position to assist are asked to address seed samples to:

Señor Don Ricardo de Escauriaza, Estación de Praticultura, Granja Agrícola, La Coruña, Apartado No. 10, Spain.

Sudan

Philosophical Society 1025

This Society was founded in February, 1946 (President: Mr. A. J. Arkell) and in the *Proceedings* for 1946-7 are papers on various subjects which include archaeology, administration, ecology, agricultural research, forestry, history, transport, and others. The officers for 1948-9 are: President, Dr. J. Smith; Vice-President, G. W. Ogden; Honorary Secretary, A. W. Ireland; Assistant Honorary Secretary, L. S. Cobley; Honorary Treasurer, G. C. Wood. The address is the Secretary's Office, c/o General Post Office, Khartoum.—M.H.

Tanganyika

Vegetation Map 1026

The American Geographical Society of New York has published " A vegetation-types map of Tanganyika Territory " by Clement Gillman. Copies are available (1 dollar, post paid) from the publishers at 156th. St. Broadway, New York.—M.H.

South America

Botanical Congress 1027

The Proceedings, including the scientific papers presented to the Second South American Botanical Congress held at Tucumán, Argentina, in October, 1948, are to be published in the botanical journal *Lilloa.* The Third Congress is to be held at Bogota, Colombia, in 1952. A Committee is to prepare a glossary of botanical and ecological terms current in different parts of the South American continent, for submission to the approval of the Third Congress. *Rev. argent. Agron.* Dec. 1948.—G.M.R.

Colombia

Agricultural Expansion 1028

Of the Colombian population 70 per cent, mostly people living and working on the land, are believed to exist on an insufficiently nutritive diet. At the same time some 80 per cent of the area suitable for growing tropical food stuffs such as maize, cassava, rice, beans, sesame, etc., and cash crops such as cotton and other fibres remains untouched. In the July issue of *Agricultura Tropical, G. V. Gonzalez* of the Colombian Ministry of Agriculture discusses the difficulties, mostly of a social and economic nature, confronting agricultural expansion. In the same issue *G. R. Nunez,* of the Palmira Agricultural Experiment Station, urges the growing of soybeans in Colombia. The Station disposes of seed of seven commercial varieties which are very productive in the Cauca valley. *C. A. Urueta F.* writes on the nutritive value of the soybean, and a Spanish version of W. J. Morse's article on " Soybeans yesterday and today " is reprinted from *Foreign Agric.,* May 1948.—G.M.R.

FIELD CROP ABSTRACTS

LAND UTILIZATION AND MANAGEMENT

HARPENDEN, Commonwealth Bureau of Soil Science. Tech. Comm. No. 45. **The practice of soil conservation in the British Colonial Empire.** By *Sir H. A. Tempany*. 1949. pp. 106. **1029**

Subsequent to an earlier review of the position (*Herb. Abstr.* 15. Abs. 46), a questionnaire was issued by the Colonial Office to Directors of Agriculture in dependencies where soil conservation has obtained considerable development, seeking information on a number of points. The gist of their replies is combined in this new publication with data taken from published papers, reports and material supplied from other sources. This publication therefore represents an up-to-date picture of the situation in the British Colonial Empire, with special reference to Kenya, Tanganyika, Uganda, Nyasaland, Northern Rhodesia, Southern Rhodesia, Basutoland, Swaziland, Ceylon, Cyprus, Jamaica, the Windward Islands and the Leeward Islands. The information collected has been dealt with on the general basis of the methods employed. The methods are divided into those dependent on the use of earth structures and those dependent on cultural practices and the use of living plant material. There are also sections on grazing and management of live stock, the development of new farming systems, implements and machinery, and the types of legislative and administrative measures which have been adopted in the U.S.A. and the British Colonial Empire to provide for soil conservation.—R.O.W.

FOOD AND AGRICULTURE ORGANIZATION. Agric. Studies No. 3. **Using salty land.** By *H. Greene*. Washington. pp. 49. 1948. **1030**

A general description of the causes and distribution of salty lands, based largely on research work at the Gezira Research Station and in Russia. The author also describes the work in progress for salty land reclamation by the use of irrigation water, gypsum, and other soil improvers in Egypt, Sudan Gezira, Teulsin area of North China, San Joachin Valley California, USSR regions, Hungary, and on marine lands in New Zealand, Germany and Holland.—K.J.S.

ROME, International Institute of Agriculture. **The agrarian reform. 1. Finland.** pp. 106. 1948. **1031**

The causes underlying the present position of land tenure in Finland are outlined, and considerable attention is paid to land use in the country. Natural meadow and pasturage amount to 3.5 per cent of the total area, compared with a forest area of 73.4 per cent of the total. The division of the cultivable lands in the inter-war periods reveals that the area devoted to cereals was 828,147 ha., with much smaller areas under potatoes, roots, flax, and hemp, and green forage. Over one million hectares were under hay. Oats and rye were the most important cereals, with barley, peas, meslin and wheat occupying smaller areas. The productivity of the nation's agriculture is examined, and other factors which influence farmers' returns are considered.—T.G.J.

BRUENE, F. Die Praxis der Moor- und Heidekultur. [**The practice of moor and heath cultivation.**] 24 × 16. pp. 265. Berlin. 1948. **1032**

A comprehensive review is given of the extent and significance in German agriculture of the various types of moorland found there. The introduction deals with the total area of moor and heath soils, which amounts to about 10 million acres, the economic importance of these soils, and the effect of their cultivation on the climate.

The main part of the work is devoted to the cultivation of moorland. This deals first with the division of moors into Niederungsmoore, Hochmoore and Übergangsmoore (fen, raised bog and " transition " moor). Then follow sections on the natural vegetation and the important physical and chemical characteristics of moorland soils, and related aspects.

The section on the cultivation of moorland proceeds from the regulation of the water regime to the actual methods of cultivation and so to the crops and types of grassland which can be grown on such soil when reclaimed for agriculture. These aspects are described insofar as they relate to fen or raised bog respectively. There are special sections on the cultivation of grass and clover seed on these soils.

The heath soils are found on an area just over half that of the moor soils. Their characteristics and method of utilization for arable or grassland production are dealt with separately.

There are seventy-three references, all from European literature.—R. O. Whyte.

PERICCIOLI, M. L'ordinamento colturale nell' Appennino Centrale. [**Cultural arrangement in the Central Apennines.**] *Ann. Ente consorz. interprov. toscano Sementi* **3.** 1939-43. 163-72. 1944. [Received 1949] **1033**

Marassi, A. La degradazione dei terreni nei paesi tropicali. 2. [**Soil deterioration in the tropical countries. 2.**] *Riv. Agric. subtrop. e trop.* **42.** 159-80. [English summary, p. 179] 1948. **1034**

The author examines the causes of humus destruction in the agriculture of tropical countries and consequent soil deterioration. Cover plants and green manuring aid humus formation and conservation, and their use is explained in regions having different rainfall.—E.B.

Biasco, A. Acceleramento della bonifica in provincia di Lecce nel piano E.R.P. [**Speeding of land reclamation in province of Lecce in the E.R.P. plan**] *Humus, Milan* **5.** 12-5. 1949. **1035**

This is the first of a series of articles reviewing the programme of land reclamation in the principal Italian agricultural provinces.—E.B.

ГОРШЕНИН, Н. М. Полезащитные лесные полосы и борьба с засухой. *Природа, Москва* 1949. *No.* 2. стр. 3-23.

Goršenin, N. M. [**Shelter belts and control of effects of drought.**] *Priroda, Moskva,* 1949. No. 2. 3-23. **1036**

The measures of the decree published on 24 October, 1948, by the CK VKP (b) [Central Committee of the All-Union Communist Party] are considered in some detail with regard to problems of soil and atmospheric moisture. The paper includes a map on which the location of the belts are indicated and there is a review of the work in the Stony Steppe area where improvements have been obtained by protected sowings of lucerne/*Agropyron cristatum*, esparsette/*A. cristatum*, and clover/timothy.—M.H.

Brynaert, J., and Toussaint, L. Etude pédobotanique et propositions d'aménagement agricole et forestier des savanes dégradées de la region nord de Matadi. [**Pedological and botanical study and proposals of agricultural and forestal management of the degraded savannah of the region situated north of Matadi (Belgian Congo).**] *Bull. agric. Congo belge* **40.** 546-74. 1949. **1037**

The savannah of this region is principally of the shrubby type and the grasses present are *Andropogon* and *Hyparrhenia*, with predominance of *H. diplandra.* The present exploitation of the land is irrational and returns from groundnut and manioc are small. If the savannah is protected from burning, which is the usual practice carried out by the natives at the end of the dry season, it evolves into forest. Results of plant survey on plots protected for over 8 years are tabulated. The return to the natural forest is considered the only possibility of protecting the soil and restoring fertility. Subsequently, cultivation in alternated strips on forestal land should maintain fertility and give economic returns.—E.B.

Opsomer, J.-E. La mise en valeur des terrains soumis aux crues des rivières. [**Utilization of lands susceptible to periodic river flooding.**] *Bull. agric. Congo belge* **40.** 870-2. 1949. **1038**

This is a summary of a previous article published in 1942. Methods of rice cultivation in the Far East, which utilize the rise of the rivers, are described. Such lands can also be utilized, during the periods they are dry, by growing crops with a short vegetative period, such as dry rice, manioc, yam, bean, maize and groundnut. Trials in regions under such conditions in the Belgian Congo have been started.—E.B.

Bouyer, S. Contribution à l'étude agrologique des sols du Sénégal (Casamance exceptée). [**Contribution to the agronomic study of the soils of Senegal (Casamance excluded).**] *Bull. agric. Congo belge* **40.** 887-1020. 1949. **1039**

This work has been carried out by the Soudanese Section of Agronomic Researches at M'Bambey. The climate of the region is characterized by a wet season from June to the beginning of November and a dry season from November to the end of May. The function of vegetation in soil conservation and improvement is examined. Groundnut and pearl-millet (*Pennisetum*), grown on sandy soils (which are prevalent in the region), are the principal resources, millet being the basic food for the natives and groundnut the product for exportation. Groundnut varieties with a vegetative period of 115 to 120 days are grown during the wet season. During the dry season no cultivation can take place. The success of the crop is generally compromised if drought begins in advance, and the importance of the last rainfall in respect of returns is examined. No other crop is considered suitable for this environment. The spontaneous species of the region are indicated. Great millet (*Sorghum*) is grown to a certain extent on sandy-clayish soils (which, however, are often left fallow) and on clay soils. The two principal rotations followed in Senegal are: millet/groundnut/fallow, or millet/fallow/groundnut. In both cases only millet is manured, because organic manure given to groundnut is the cause of empty shells in percentages up to 20 per cent, as trials carried out at the M'Bambey station have proved. After a long period of cultivation, groundnut loses partially the capacity of nitrogen fixation, and root nodules appear to be reduced. At this stage it is necessary to suspend cultivation for a few years, and then employ seed inoculated with *Bacterium radicicola.* For groundnut cultivation a pH of the soil averaging neutrality is the most suitable. Rice is grown on clay soils in the alluvial valleys. Organic manuring is required by this crop but live stock is scarce and rotations with crops for green manure must be introduced. Manuring with ammonium sulphate is advised.—E.B.

RAMDAS, L. A. **Soil moisture and evaporation investigations.** *Cent. Bd Irrig. J.* **5.** 262-71. 1948. [Met. Office, Poona] **1040**

Relations between hydrology and agriculture have been studied by the Agricultural Meteorology Section using a number of different instruments. The crops used in the experiments include jowar, double bean, sugar cane and betel vine and results on the local black cotton soil are compared with those on representative soils from the rest of the country. Two problems relating to sub-soil irrigation were also studied by means of a new apparatus, the depth to which plant roots can penetrate in their search for water and the relation between plant root and shoot development and the depth of the water table. With jowar seedlings (*Sorghum* sp.) root development increased with a receding water table until a level 17 in. below the soil surface was reached and beyond that the seedlings were unable to survive after transplantation. The effects of certain salts on the black cotton soil and of mixing sand with the soil were studied among other investigations.—M.E.E.

CHEPIL, W. S. **Wind erosion control with shelterbelts in North China.** *Agron. J.* **41.** 127-9. 1949. **1041**

The difficulties of controlling soil erosion in certain districts of northern China are discussed and the system of control adopted, described.—T.D.H.

LAI-YUNG LI and CHU-YING CHOU. [**A preliminary survey of wind erosion with recommendations for soil protection on Haitan Island, Fukien.**] *Fukien agric. J.* **10.** 37-48. 1948. [English summary, pp. 47-8.] **1042**

Haitan Island is situated between the sea-coast of Fukien Province and the northern tip of Formosa. Hilly regions of the Island are rocky and the soil is lateritic. All lower areas are covered with fine sand, varying in depth from several inches to a few feet, underlaid with red and yellow soil. Crops are mostly grown in this sandy soil which is easily eroded and suffers tremendous losses annually.

Suggested methods for control of wind erosion on Haitan are: (1) roughing of soil surfaces; (2) placement of obstructions—wooden or stone fences, laying of brush on the ground and establishment of shelter-belts; (3) retention and increase of organic matter in the soil. Among those plants suggested for shelter are Bermuda grass, Kudzu, grain sorghum and various indigenous legumes. All types of water erosion are present. Terracing is common, but it is suggested that more vegetative control measures should be adopted; barren areas should be planted with some species of trees which would also serve as a source of urgently needed fuel. All other barren sites should be occupied by such native legumes as *Lespedeza, Desmodium* and *Crotalaria.*—From English summary.

PETRAS, W. H. **Land management methods to reduce our erosion losses.** *J. Dep. Agric. S. Aust.* **52.** 82-3. 1948. **1043**

It has recently been stated that the greater portion of the damage attributed to wind over the past few years has actually been made possible by defects in land management. At its best the productivity of the soil in many wind eroded areas is not great, and the loss of approximately one-tenth of the acres sown cannot be afforded. Farming methods must therefore be developed to counteract wind erosion. Seeding should be carried out while the wind velocity is low, and ground proposed to be sown should be well and completely prepared beforehand. Questionable sandhills in the cropping area should be dissected from the remainder of the land and sown with rye. This prevents these sandhills from becoming bared by wind, and acres of crops on the better land below are thus protected from destruction by drifting sand.

Experience has shown that only an early-sown, reasonably thick, vigorous-growing crop is the one that can be regarded as safe. Although a certain amount of the later germination of weeds will be present with an early crop, the damage caused by these is much less than that of the wind which would probably accompany a later crop.

Many farmers attempt to grow more crops than they can handle and the last hundred or so acres are usually the ones which show the highest percentage of wind damage. This is because of careless management. It is much better to grow fewer crops which will be successful than to try growing too many which will only result in loss of both time and money.—J.T.B.

LEEPER, G. W. **The soils of Australia.** [contained in] Australia, its resources and development. Edited by G. L. Wood. 1947. 52-8. **1044**

See Abs. 1007.

CALLAGHAN, A. R. **Progress in land development, 1948.** (**Non-irrigation**) *J. Dep. Agric. S. Aust.* **52.** 356-73. 1949. **1045**

LIGHTFOOT, L. C. **Soil conservation. Methods for the control of water erosion.** *J. Dep. Agric. W. Aust.* **25.** 390-411. 1948. **1046**

Methods by which water erosion is taking place in the 15- to 25-inch rainbelt of Western Australia are explained. The importance of improved pastures for combatting loss of top soil and the use of *Trifolium subterraneum* in particular are emphasized together with the need for further development of sound crop rotations. On poor soils *Secale cereale* has shown most promise in developing adequate cover protection against water erosion. The control of water erosion includes mechanical methods such as contouring, and revegetation methods such as the use of *Paspalum vaginatum* on moist salt gullies. Contour banking is the most costly method of controlling soil erosion, but contour banks are recommended for use with other methods, and instructions are given for their successful construction and maintenance.—M.E.E.

SREENIVAS, L., JOHNSTON, J. R., and HILL, H. O. **Some relationships of vegetations and soil detachment in the erosion process.** *Proc. Soil Sci. Soc. Amer.* **12.** 471-4. 1947. **1047**

See *Soils and Fertilizers.*

WOODRUFF, C. M. **Erosion in relation to rainfall, crop cover and slope on a greenhouse plot.** *Proc. Soil Sci. Soc. Amer.* **12.** 475-8. 1947. **1048**

See *Soils and Fertilizers.*

KNOBLAUCH, H. C., and HAYNES, J. L. **The effect of contour-cultivation on run-off.** *Trans. Amer. geophys. Un.* 1940. 499-505. [Received 1949] **1049**

NEAL, O. R. **Soil moisture-content under various conservation practices.** *Trans. Amer. geophys. Un.* 1939. 686-90. [Received 1949.] **1050**

ZINGG, A. W. **The determination of infiltration-rates on small agricultural watersheds.** *Trans. Amer. geophys. Un.* 1943. 475-80. [Received 1949] **1051**

A detailed description of the catchment areas has been given in an earlier publication ; it is on the Shelby soil at Bethany, Missouri, 7.5 acres in area, has an average slope of 6.5 per cent, and was contour-drilled to maize in 1941. The present object was to evaluate more recent techniques developed for determining from precipitation and run-off data the infiltration rate during storm run-off.—R.O.W.

JONES, G. H. **Hydrology of valley areas adjacent to the Upper San Joaquin River.** *Trans. Amer. geophys. Un.* 1940. 57-78. [Received 1949.] **1052**

GLEASON, C. H., and MACBEAN, D. G. **Use of the helicopter for sowing mustard seed in burned areas of Southern California.** *J. For.* **47.** 192-5. 1949. **1053**

Sowing of common mustard (*Brassica nigra*) is the best method developed to date for rapidly providing a temporary plant cover in recently burned areas, to reduce damage from accelerated run-off and erosion. Of the 90,000 acres so far sown, about one-half has been sown by helicopter. The topography of the country sown was very rugged and before seeding by air, trial flights were made by the helicopter over level land to determine the width of swath sown and to obtain the proper concentration of seed within the swath. The width of the swath and concentration of the seed vary with the size and weight of seed used, the design of the seeding mechanism and the height and speed of the aircraft.

Sowing was done mainly on the contours, starting at the top of a sowing area and working downwards. In 8.5 hr. flying time, 125 acres were sown. Ground examination of the sown areas made after the mustard was in flower showed the excellence of seed distribution.

Total cost was approximately $2.78 per acre ; this figure included flying, seed, ground labour, automobile mileage and incidentals. The figure was high because of the contract cost of $1.59 per acre for flying alone. In a comparison with seeding by aeroplane, costs per acre by helicopter were $1.84 and by aeroplane $1.82.—P.M.

UNITED STATES, Department of Agriculture, Soil Conservation Service. Tech. Bull. 959. **Investigation in erosion control and the reclamation of eroded land at the Missouri Valley Loess Conservation Experiment Station, Clarinda, Iowa, 1931-42.** 1948. pp. 88. **1054**

These loess soils were ploughed up from prairie 60 to 80 years ago and have lost up to 50 per cent of the normal top soil by sheet erosion. There is also phenomenal gulley development. Data of rainfall, run-off and erosion losses are reported in detail for the 12-year experiment. The cropping aspect is mainly noticed in this abstract.

Soil losses were negligible and run-off was materially reduced with good pasture sods and meadow crops regardless of length or steepness of slope. The crops were *Poa pratensis*, red clover, lucerne and brome grass. Cereals are much more of an erosion hazard, particularly during April-May, than sod crops but cause only half as much erosion as maize grown in a rotation with oats and clover. Soil loss from continuous maize is double that from rotation maize ; top soil loss under continuous maize is about 1 inch in 3.5 years. Under continuous maize, erosion was 1.4 times as fast from eroded soil as from normal soil. A continuous maize cropping system decreased the original carbon content of the soil 16 per cent ; the carbon level was maintained by the maize rotation and was maintained but not increased by continuous *Poa* or lucerne.

As an 11-year average, continuous maize on desurfaced soil yielded 6.6 bushels per acre and on normal soil 28.5 bu/acre ; maize in the rotation 42.9 bu/acre. The effect of rotation on maize yields becomes more evident with time and with favourable weather conditions; rotation maize out-yielded continuous maize by 36.2 bu/acre in 1940/42. The average annual yields of hay for 1933 to 42 from continuous lucerne was 3.3 and from red clover 1.5 tons per acre. The annual application of 8 and 16 tons per acre of farmyard manure or leguminous green manure reduced soil and water losses and increased maize yields. Farmers in the region are advised to include more close-growing crops in their rotations and to adopt other soil conservation practices. The experiments show the benefit of contouring and listing of maize on the contour, impounding treatments, which must be adapted to slope, strip cropping (not always satisfactory), terracing, found to give nearly complete control from losses of soil and water on marshall soils and the use of organic matter to maintain soil structure.

Factors responsible for the high acreage of maize in the region are: non-recognition of grasses and legumes as fodder, high valuation of land and development of large type machines.—K.J.S.

FARMING SYSTEMS

WAHLIN, B. Förnuftig växtodlingsplan av nöden. Växtföljd och parasitangrepp. [**A rational crop cultivation plan is necessary. Crop rotation and parasitic attack.**] *Lantm. Svenskt Land* **33.** 183-4. 1949. [Director, Plant Protection Institute, Linköping] **1055**

Remunerative crop cultivation involves a continual change of cultivated plants on one and the same field, otherwise a considerable reduction in yield would result.

Foot-rot diseases of wheat and barley are typical crop rotation diseases. The best preventive measure is to adopt a rotation in which the susceptible crops are not grown more frequently than every other year at most, preferably every third or every fourth year. Attack of spring rape by thrips is considerably more severe if the preceding crop has been flax. There is reason to think that it will be possible to utilize the phosphoric acid-esters (for example E605) in the control of thrips on rape, etc.—R.P.J.

THOMPSON, Alan. **Your smallholding.** A Penguin Handbook (PH13). West Drayton, Middlesex, 1947. pp. 191. 1s. 6d. **1056**

A concise account of the management of a small-holding under British conditions, with special reference to the husbandry and feeding of various forms of live stock such as cows, poultry, pigs, goats, rabbits and bees.—R. O. Whyte.

PATERSON, R. **This year—next year.** *Fmr's Wkly* **30.** 42-3. 1949. **1057**

In this third article on "leys" the author attempts to illustrate the effect of the ley on the grain crops in a rotation and to show how the yields are influenced in comparison with other methods of cropping. A graph shows the yields over a period of years (1940-48) on three of the author's farms which have been ploughed, cropped and sown to leys. Conclusions from these results are that while short leys have increased the 4-year average yield over straight grain by 27 per cent, the longer leys only raised the yield by about 16 per cent. The risk of wireworm damage to freshly ploughed and seeded land is minimised by breaking up the leys in mid-summer, when maximum growth has ceased. This is bastard fallowed, and sown to winter corn. —K.O.

ТЮРИН, И. В. Значение учения Акад. В. Р. Вильямса для почвоведения и земледелия. *Природа*, *Москва* 1949. *No.* 4. стр. 30-7.

TJURIN, I. V. [**The importance of V. R. Viljjam's teaching for pedology and for agriculture.**] *Priroda, Moskva* 1949. No. 4. 30-7. **1058**

This is a popular account of the Viljjams-Kostučev-Dokučaev complex and the possibilities of its application in different zones of USSR.—M.H.

НАЙДИН, П. Г. Система удобрения в травопольных севооборотах. *Совет. Агрон.* 1949. *No.* 1. стр. 62-71.

NAĬDIN, P. G. [**A system of manuring for ley rotations.**] *Sovet. Agron.* 1949. No. 1. 62-71. **1059**

There is discussion of the effectivity of fertilizers on crops of all types in relation to soil and climatic conditions which prevail in various parts of the Soviet Union. The primary factors affecting the beneficial results obtained from manuring systems are soil moisture and soil structure. It is therefore necessary to study the fertilizer system in relation to preparation of the soil before sowing, to mixture used in sowings, to crop sequence, to effect on the soil of harvesting the crop, etc. The specific fertilizers necessary for rotations which include cotton/lucerne, flax/herbage, sugar beet/grain crops and others are discussed, and the need for improving agrotechnical methods, the yielding capacity and resistance of the crops sown is emphasized.—M.H.

PALESTINE, Agricultural Research Station, Rehovot. Bull. 46. **Organic substitutes for animal manure. 1. Huminal.** By *M. Plaut* and *S. Hurwitz.* 1948. pp. 35. **1060**

Huminal A and B compared favourably with cow manure in regard to yield of the following crops grown in an experimental rotation under irrigation:—potatoes, setaria, green maize, Ochrus (*Lathyrus ochrus*), sunflowers, cowpeas, field-peas, green maize. The plots were replicated. The soil was a medium sandy clay. The experimental period was 3 years.

The organic matter was utilized by the potato crop to the extent of one-third to one-half of its total nutrient value; the first four crops in the rotation together used up more than 80 per cent of the organic matter. Under Palestine climatic conditions organic matter is decomposed rapidly and should be renewed by applying organic manures to irrigated crops grown in rotation.—K.J.S.

КАСАТКИН, Б. В. Применение удобрений в начальных звеньях травопольного севооборота. *Совет. Агрон.* 1949. *No.* 1. стр. 72-6.

KASATKIN, B. V. [**The application of fertilizers at the beginning of a ley rotation.**] *Sovet. Agron.* 1949. No. 1. 72-6. [All-Union Sci. Res. Inst. Oil Crops] **1061**

The fertilizer tests were made on a 10-course rotation as follows: (1) 1st year herbage mixture (lucerne and *Agropyron*); (2) 2nd year herbage mixture; (3) spring wheat and proso millet; (4) winter wheat; (5) oil crop and maize; (6) winter wheat; (7) bare fallow; (8) winter wheat; (9) sunflower, soybean; (10) winter wheat, spring barley. In the black earth soils of the Kuban, phosphoric acid, potassium fertilizers and farm manure applied in the 1, 3 and 4 courses greatly increased the yields of herbage and wheat. In areas where moisture is deficient, in addition to the use of fertilizer, it is necessary to conserve the snowfall.

Tabulated details are given of increases obtained from the different crops with variants of the fertilizers.—M.H.

ПАШАТОВА, В. А., и ЯЦЕНКО, В. Г. Опыт освоения травопольной системы земледелия на полях Верхне-Хавского Госсортоучастка. *Совет. Агрон.* 1949. *No.* 2. стр. 72-7.

PAŠATOVA, V. A., and JACENKO, V. G. [**The ley system of farming in the Verhne-Havsk State Selection Field.**] *Sovet. Agron.* 1949. No. 2. 72-7. **1062**

In 1947 the work of this Experimental Field had been in progress for 10 years, and the studies which concern the forest/steppe area of the Voronež Province are of value to supplement those carried out by the Dokučaev Institute in the steppe zone of this Province. The Verhne-Havsk Field was established on a former collective farm, where conditions are typical of the forest/steppe zone. Average annual precipitation is 450 to 500 mm. and average annual temperature +5.3°. The rainfall is often inadequate during the critical vegetative period and a rapid rise in spring temperature together with a sharp decline in autumn are characteristic of the region. The soil comprises 90 per cent of weakly leached black earths, and the remainder is strongly leached, distributed mainly in the western area.

Although both clover and lucerne have been recommended for the leguminous component of herbage sowings, data of this Station show that lucerne is preferable because clover is often killed in winter. Details of agrotechnical measures found most suitable for the inclusion of a ley in the rotation are supplied. When crops are grown in a rotation involving fallow and hoed crops they are subject to atmospheric and soil drought simultaneously, which is inevitable in structureless soils. Use of the ley obviates this problem to a great extent; further, in the experience of this Experimental Field, the ley system ensures better yields of hard wheats which in some instances have attained or excelled those of soft wheats.—M.H.

БУРНАЦКИЙ, Д. П., и СУЧАЛКИНА, М. И. Водный режим почв Каменной Степи в засушливые годы. *Агробиология*, 1949. *No.* 1. стр. 148-60.

BURNACKIĬ, D. P., and SUČALKINA, M. I. [**The water regime of the soil of the Stony Steppe in dry years.**] *Agrobiologija* 1949. No. 1. 148-60. [Dokučaev Inst. Agric., Talovaja, Voronež Province] **1063**

In the Stony Steppe observations have been made on soil moisture conditions chiefly in connexion with agrotechnical questions and only recently has the water regime of soils been studied in relation to ley farming. The work here is concerned with the very dry year, 1946, and 1947 when there was deficient moisture during the vegetative period. The water regime of the soil was studied under the following rotation, located in the open steppe and also in an area protected by a shelterbelt: (1) herbage; (2) spring wheat (in perennial herbage); (3) spring wheat (on ploughed soil); (4) sunflower; (5) oats; (6) bare fallow; and (7) winter wheat with undersowing of herbage. With the onset of drought in both years the soil dried and crop yields were lowered but less so in the protected sowings. There is indication, further, that the herbage in the rotation made more efficient use of winter precipitation.—M.H.

MIRCHANDANI, R. T. **Irrigated farming with particular reference to Sind.** *Indian Fmg* **8.** 501-3. 1947. [Received 1949] [Agric. Headquarters, Karachi] **1064**

Emphasis is laid on the varying nature of the soils in Sind and the consequent complexity of the problems of irrigation and reclamation. Water requirements have been ascertained not only for the different crops but also for the different banks of the river where distinctive soil conditions occur. Applications of irrigation water in acre-inches are given in detail for wheat and cotton and the expectation of *Kharif* and *rabi* crop production is discussed.

Many areas of Sind are impregnated with salts of an injurious nature and such land is locally called *Kalar*. The *kalar* lands can be classified into (a) those with a sandy sub-soil and (b) those with a clay sub-soil, and the work of reclaiming such lands is described. After leaching the soil, agronomical methods are employed which include systems of rotation with beneficial crops. *Pennisetum typhoideum* and *Setaria italica* are grown during the first years of reclamation during the summer season while *Trifolium alexandrinum* is grown during the winter months.

To prevent the accumulation of soluble salts and the formation of *kalar* lands it is necessary to educate the cultivator in the economic utilization of irrigation water and the use of correct crop rotations.—M.E.E.

PARR, C. H. **Use of surplus monsoon river water to increase crop production.** *Indian Fmg* **8.** 436-43. 1947. [Received 1949] [Indian Agric. Res. Inst., New Delhi] **1065**

Surplus river water from the monsoon floods can be utilized either to water the standing summer crops where rainfall is deficient or to water fallow fields prepared for winter crops. Large increases in yield of wheat, barley and *Cicer arietinum* have been attained by irrigating in this way in summer. An example of a rain-fed winter crop which has considerable possibilities of increased production is that of oilseeds. During experiments from 1944 to 1946 the species *Linum usitatissimum, Brassica campestris* var. *sarson, Brassica napus* and *Eruca sativa* were grown under rain-fed conditions and also under conditions permitting irrigation by surplus water in September and the irrigated crops were generally higher in yield. Care must be taken to avoid the washing down of soil nitrates through applying too much surplus water to the soil in September. The necessary conditions for successful flood water farming are summarized, and some comparisons are made between irrigated and dry land farming in the U.S.A. and in India.—M.E.E.

SMITH, R. J. **The California State Land Settlements at Durham and Delhi.** *Hilgardia* **15.** 399-492. 1943. [Calif. Agric. Expt. Sta.] **1066**

The settlement activities of these two areas in California are described and analysed, and no comparisons are made with other government or private projects. The Durham settlement lies in the Sacramento Valley while the larger Delhi settlement is situated in the San Joaquin valley and lower foothills of the Sierra Nevada. Soils and drainage systems are described and particular reference is made to the economic aspects of farmstead planning. Production problems were investigated including the management of adobe lands in the Durham settlement. From details of crops produced, including alfalfa, it is apparent that farming was not profitable on the whole and land values shrank in only a few years. Difficulties were found in irrigation due to costly installation and difficult management and various diseases reduced crop yields. Some reorganization work took place but the State was unable to make these settlements into prosperous farming areas, and the case study concludes by summarizing some of the causes of failure.—M.E.E.

WILSON, H. A., GISH, R., and BROWNING, G. M. **Cropping systems and season as factors affecting aggregate stability.** *Proc. Soil Sci. Soc. Amer.* **12.** 36-8. 1947. [Iowa State Coll.] **1067**

The effect of various cropping systems on the stability of soil aggregates is studied in an attempt to correlate stability with liability of the soil to erosion. The main problem is whether stability of soil aggregates with no shaking or with different amounts of end-over-end shaking is the best guide to erosion liability. If no shaking is taken as the index then soils under different cropping systems when placed in order of liability to erosion are reeds, continuous corn, rotation corn, rotation meadow, and bluegrass. When any degree of shaking is considered however, soil aggregates from fields under continuous corn are the most stable. On the basis of this study there is no evidence to indicate which treatment of the soil (shaking or not) is superior in characterizing soil structure in relation to erosion.—T.D.H.

NORTH CAROLINA STATE COLLEGE. **A farm program for North Carolina.** 1948. pp. 43. **1068**

The three major crops grown in 1946 were tobacco, cotton and peanuts. Many farms are too small for efficient working, the average being 26.4 acres. There are too many people for full employment in agriculture especially as under the present types of farming the labour required is largely seasonal.

A programme is suggested in which the 3 major crops should continue to hold their importance but special crops such as sweet potato and small fruits should be increased in certain areas. More grain and grass should be grown on idle land and the livestock population be increased, the type of live stock depending on local conditions. Better use should also be made of farm woodlands.

This programme should be a long term one and all sections of the community should co-operate in implementing it and modifying it to local conditions. Education must be the means of bridging the gap between research and practice.—G.M.W.

CROPS AND CROP PRODUCTION

WESTERMARCK, N. Landbruket i de nordiske land. Felles trekk og ulikheter. [**Agriculture in the Scandinavian countries. Similarities and differences.**] *Norsk Landbr.* **15.** 127-30. 1949. **1069**

Text of an address delivered at the Royal Agricultural College of Sweden on January 2, 1949. The comparison (illustrated by figures) was made under the following headings : extent and composition of the agricultural population, size and number of holdings, extent and structure of crop cultivation and animal husbandry. A survey of economic conditions in agriculture was included.—R.P.J.

ÅKERBERG, E. Växtförädlingen och utvecklingen av Norrlands växtodling. [**Plant breeding and the development of crop cultivation in Norrland.**] *Nord. JordbrForskn.* 1948. No. 7-8. 225-38. **1070**

The crop increase in Norrland, as in the whole of Sweden, amounted during the period 1921-1940 to approximately 20 per cent. Prerequisites for crop cultivation in Norrland are discussed, also problems of plant breeding with special reference to grasses, clovers, cereals and pulses.—R.P.J.

STOLP, D. W. Onderzoek en voorlichting in het geïnundeerde gedeelte van Noord-Zeeland en Overflakkee vanaf de inundatie tot het tijdstip van droogvallen. [**Investigations and advisory service in the inundated part of North Zeeland and Overflakkee from the inundation to the time of drying.**] 2nd edn. Rijkslandbouwconsulent v. Noord-Zeeland en Goeree-Overflakkee Med. No. 1. 1945. pp. 118. Charts. Col. maps. [Asst., Agric. Information Service, Netherlands.] **1071**

This booklet contains an account of research, conducted under difficulties in 1944 and 1945, on the restoration of the inundated parts of the islands lying to the east of Walcheren off the Netherlands' north coast. The information given is mainly concerned with soil structure and its content of NaCl. The rate of leaching of NaCl is portrayed in six coloured maps showing salt content as determined at intervals from May 24, 1944, to May 24, 1945. Pot and field trials tested the conditions under which crops could be successfully grown, in which not only the salt content of the soil, but also the effect of correctives such as gypsum were taken into account. The Wieringermeer Authority has determined certain salt content limits within which it is safe to sow crops. These so-called " sowing limits" are expressed as C, which denotes the NaCl content in grm. per litre soil moisture. For the sowing of summer crops, C in the 5 to 20 cm. deep soil layer may not exceed approximately 5, because the leaching of salt practically comes to a standstill in the summer months. Winter crops, however, may be sown when C in the 5 to 20 cm. soil layer is as high as 12, because, given normally early and abundant rainfall, leaching is resumed at a relatively rapid rate in the autumn and winter. In the case of rape, which has to germinate before the autumn rains set in, C may not exceed 7 to 8.—G.M.R.

HUNGARY, MOSONMAGYARÓVÁR. Bull. 6/5. State Exp. Inst. Plant Ind. Tervezet a növénytermesztésben használatos egyes cikkek, anyagok és termények forgalmának szabályozására. [**A project for regulating the marketing of different materials used in plant growing.**] By *L. Dworak.* 1947. pp. 4. [English summary, p. 4.] **1072**

The author deprecates the absence in Hungary of any control of the marketing of fertilizers, soil-improving agents, inoculants, and seeds of " plant novelties " (excluding improved seed), and makes proposals concerning State recognition and control of marketing.—From English summary.

DWORAK, L., KOVÁCS, E., and SZÉLES, G. Bull. No. 6/7 State Exp. Inst. Plant Ind. Termeléspolitikai útmutató. [**Cartographical guide for policy of plant cultivation.**] With 46 maps. Mosonmagyaróvár 1947. pp. 10. [English summary, p. 10] **1073**

This publication has a brief text and forty-six maps showing the various crop regions of Hungary. Regions with high yields on relatively small acreages, regions with yields and acreages in balance, and regions with low yields on large acreages are all indicated. If production could be better planned and brought into balance, increased total yields could be obtained with an increase of 7 to 8 per cent of total acreage. The maps are not intended for the use of farmers but for the administrative authorities. They cover all crops of Hungary, from cereals, legumes for grain, root crops, fodder crops to industrial crops such as flax (for fibre) and hemp.—From English summary.

DWORAK, L., and SZÉLES, G. Bull. 6/4. State Exp. Inst. Plant Ind. Szántóföldi termelésünk torzultsága. [**Disharmony in Hungarian crop production.**] Mosonmagyaróvár 1947. pp. 14. [English summary, p. 14] **1074**

The economic plants introduced into Hungary from the North-west (e.g. barley, oats, potato) grow under unfavourable conditions in Hungary, their yields are low and they therefore do not tax the nutrient status or water content of the soil. Plants from the South-east (sunflower, sorghum and maize) find growing conditions in Hungary favourable ; their yields are high and they draw on the nutrient and water reserves of the soil. These two types of crops are regarded as " passive " and " active " respectively.

Systems of rotation should be so planned as to ensure a proper balance between passive and active crops; it is necessary to increase the use of active plants in Hungarian agriculture.—From English summary.

DRAGHETTI, A. I sistemi di irrigazione con particolare riguardo alle terre argillose. [**Systems of irrigation with particular reference to clay soils.**] *Ital. agric.* **86.** 213-9. 1949. **1075**

So far, in Italy, irrigation has almost exclusively been applied on permeable soils, or to special crops such as rice and permanent meadows. Quality of the soil, crop, climate, etc., must be considered when applying irrigation. On clay soils irrigation must above all be adjusted to the physical constitution of the soil. It has been ascertained that on soil of low permeability the volume of irrigation water must be about 40 to 50 per cent of the water capacity of the soil. Losses from the soil, which occur in the other systems of irrigation, are thus avoided. On the same type of soil, the quantity of water of a single irrigation is constant, but the number of irrigations varies. For instance, under the conditions of the Emilia plain, on the same soil, the same quantity of water (in a single irrigation) is given to lucerne, sugar beet, maize, hemp and potato. This quantity varies, according to the soil, from 600-700 to 800-900 cubic metres per ha. Lucerne, maize and hemp, normally require 2 irrigations; summer maize for forage, after wheat, requires 1 irrigation at the sowing and 1 when it reaches the height of a metre. The function of water in the soil is examined. Irrigation of a rotation of crops is obtained by furrows at varying distances and the water infiltrates in the field by the sides (irrigation by submersion or by superficial flowing is only used for rice and ladino clover). The technique of this system is explained. Irrigation is started when the first crack appears in the soil, or a few days later.—E.B.

GASPARINI, M. Agricoltura maremmana. I problemi agronomici. [**Agriculture in Maremma. Agronomic problems.**] *Ital. agric.* **86.** 107-24. 1949. **1076**

Maremma is the south-east district of Tuscany, open to the Mediterranean influence, and has a type of agriculture well defined from the other Tuscan regions. Seat of the Etruscan civilization, it has gradually declined through centuries until about 100 years ago when it was almost an abandoned land. Works of land reclamation have defeated malaria and brought back soil to productivity. At present it is still under extensive cereal cultivation and the great extent of natural pastures, "macchia" and forest are utilized for outdoor live-stock breeding. The long summer drought is comparable to that of southern Italy but the autumn/winter rain is higher and winter is colder. Although it is desirable to extend the cultivation of forage plants, this environment is particularly suitable to cereals. Old wheat varieties and varieties grown at present are discussed. The most widely grown are "Roma" and "Autonomia" among the soft ones and "Senatore Cappelli" among the hard ones. Oat cultivation occupies 55,000 acres, about one-third of the area under wheat. The problem of finding a good renewing crop to precede wheat is examined. Bean for grain in autumn sowing, although attacked by parasites, is the most suitable. Conditions are unfavourable to maize and only early varieties, in spring sowing, with a vegetative period of 90 to 110 days, can be grown.—E.B.

CATANIA, Stazione Sperimentale di Granicoltura per la Sicilia. Publ. No. 8. Il miglioramento delle piante coltivate nei paesi tropicali e subtropicali. [**The improvement of cultivated plants in tropical and subtropical countries.**] By *U. De Cillis.* 1942. pp. 60. [Received 1948] **1077**

SALMON, S. C. **Crop improvement in Japan.** *J. Amer. Soc. Agron.* **40.** 1017-35. 1948. **1078**

A concise statistical survey preferred by an American observer. Graphs show the large increase in crop production, particularly in production per acre in pre-war years, for rice, wheat, barley, tea and mulberry culture. Fertilizer scarcity seems to be the limiting factor in further increasing productivity. Plant breeding methods resemble those of Europe and America, but are supplemented by the systematic distribution of hybrids to stations other than the originating stations. There are numerous small agricultural experiment stations throughout Japan.—K.J.S.

UNITED STATES, Department of Agriculture. Plant Invent. No. 133. **Plant material introduced by the Division of Plant Exploration and Introduction, Bureau of Plant Industry, Oct. 1, to Dec. 31, 1937.** (Nos. 124969 to 126493) 1948. pp. 85. **1079**

WASHINGTON, Food and Agriculture Organization of the United Nations. **European programs of agricultural reconstruction and development.** pp. 68. 1948. **1080**

"The purpose of the report is to delineate the general lines of the present programs of the European nations for further agricultural reconstruction and development up to about 1950/51, to appraise some of the problems and difficulties which may arise in carrying these programs through and to indicate fields into which action might be taken on national, European and world levels to deal with these problems."—Extract.

ECONOMICS OF CROP PRODUCTION

ABERDEEN, North of Scotland College of Agriculture. Agricultural Economics Department. Econ. Rep. No. 10. **Enterprise cost series. 1948.** By *D. Godfrey*, *D. J. G. Heggie* and *A. D. Imper*. 1949. pp. 13. [Mimeographed] **1081**

The crops costed were oats, turnips, potatoes and temporary grasses. In all cases, except that of temporary grass, costs of production had risen, due largely to higher labour rates.

For oats the cost of the seed, more of which was purchased than in 1947, was a further contributory cause. Labour costs formed 29.5 per cent of the total costs, for in addition to higher wages, the indifferent harvest conditions which required more labour, increased these costs.

Heavier overhead costs, added to the increased man and tractor costs, contributed largely to the rise in the cost of turnips per acre. Though farms using less horse labour, and presumably more tractor hours, apparently still used the same man hours of labour, farms using considerably more horse labour averaged nearly £2 per acre more than farms using mainly tractors.

Labour costs accounted for 35 per cent of the total gross cost per acre of potatoes, and of the total labour requirements, three-fifths was absorbed by harvesting operations. In 1948, the number of operations carried out by contract was greater than in previous years. There was a steady increase in tractor hours per acre, but no corresponding decrease in horse hours. A small decrease in man hours was due entirely to lower harvesting hours. The cost of seed was greater, largely due to more being purchased in 1948. The use of more power dressers reduced hours of labour for dressing the crop.

Though the cost of cultivations had risen for laying down temporary grass, the average net cost was lower than in 1947, due to the cheaper cost of seeds—a circumstance, however, not typical of the area.—A.D.H.

ABERDEEN, North of Scotland College of Agriculture. Agricultural Economics Department. Financial Report No. 12. **Dairy farms.** By *A. D. Imper*. pp. 5. 1949. [Mimeographed] **1082**

The total acreage under grass continued to increase while the cereal and green crop acreage decreased slightly. The average cropping distribution per 100 acres showed that rotational grasses occupied nearly half the total acreage, oats just over one-quarter, roots and permanent grassland about one-tenth each, and potatoes, barley, wheat and rye made up the remaining acreage. On balance the profits had increased.—A.D.H.

ABERDEEN, North of Scotland College of Agriculture. Agricultural Economics Department. Financial Report No. 11. **Feeding cattle.** By *A. D. Imper*. 1949. pp. 5. [Mimeographed] **1083**

The figures for the cropping position show little change, though the barley acreage has again decreased slightly, and there was a small increase in the total grass acreage.

Percentage surpluses and deficits varied from the previous year due to a greater emphasis on the live-stock enterprise which entailed more use of home-grown feeding-stuffs on the farms, and made less available for sale. Wide variations in individual results imply that more careful planning of the internal organization of farms could produce greater efficiency.—A.D.H.

EDINBURGH and East of Scotland College of Agriculture. Econ. Rep. No. 2. **Economics of livestock production. Winter fattening of sheep, 1947-48.** By *E. Stewart*. 1949. pp. 10. [Mimeographed] **1084**

Sheep fattening on turnips plays an important part in the economy of many farms in south-east Scotland, though recent acreage figures indicate a steady reduction in that of turnips. On the majority of farms in the sample, sheep were put on turnips within a fortnight of the first of November, and on average, were kept on them for just over 3 months. The size of the flocks appeared to be determined by the quantities of roots available and the organization of farm labour.

The items of cost for fattening sheep indicate the great importance of, first, the original cost of the store sheep and secondly, the cost of home-grown feeds. Of the home-grown foods, turnips amount to 66 per cent of the total cost, and oats to 17.6 per cent. Purchased foods were only 7.4 per cent of all food costs. On the whole the ration was a simple one of roots plus a limited range of supplementary foods.

There is no one factor to ensure success in fattening sheep on turnips, but there appear to be four principal factors influencing profitability; amongst these, attention to the cost of foods coupled with the judicious use of concentrates, whether home-grown or purchased, is important. —A.D.H.

DURHAM UNIVERSITY, Farm Economics Branch, King's College, Newcastle-upon-Tyne. Rep. No. G. 28. **Fodder crop costs on North Country Farms, 1947.** By *D. H. Dinsdale and T. Winter*. **n.d.** pp. 8. [Mimeographed] **1085**

Greatest reliance in arriving at crop costs was placed on the "cost of production" principle. Previously the basis used was partly cost and partly "feed value". The scope of the costings included oats, mixed corn, beans, hay, swedes and turnips, mangolds and kale. For hay costs no distinction was made between seeds and meadow hay. The details of costs given in the summary tables are tabulated in the form of a primary cost structure.—A.D.H.

DURHAM UNIVERSITY, Farm Economics Branch, King's College, Newcastle-upon-Tyne. Rep. No. FMS. 31. **Farm management survey report, 1947-48.** By *D. H. Dinsdale.* **n.d.** pp. 36. [Mimeographed] **1086**

In the three size groups of milk and cropping farms, the only tillage crops common to all were oats and potatoes though roots were common to two groups, and the average farm in addition grew wheat, barley, mixed corn, peas, beans and green fodder crops. It is difficult to say how far the inclusion or exclusion of these crops has been responsible for differences between a particular farm's profit, and the average farm profit.

On the feeding and cropping farms, oats were the only tillage crop common to all farms, and on the " mixed " farms, oats, turnips and/or swedes.

The upland farms were nearly all grass, and a substantial part of their area consisted of rough grazings. The major enterprise was the dairy herd. The least profitable of the Dales farms had a larger area of rough grazings and permanent grassland than the more profitable farms. The reverse was true for the Westmorland group.

In considering milk selling in relation to the profitability of farms, it was found that, apart from the " Feeding and Cropping " farms, all groups rely strongly on milk selling, but this does not by itself provide all the explanations of the differences in farm performances. It may be explained partly by differences in the size of herds, and partly by the rest of the farming, particularly the sheep flocks. It must also be noted that sales per cow are measures of output without reference to the cost of production.—A.D.H.

LEEDS UNIVERSITY, Department of Agriculture. Economics Section. Fmrs' Rep. No. 81. **Milk production costs in Yorkshire 1947-48.** 1949. pp. 14. **1087**

Feeding stuffs absorbed almost half of the total gross cost, and more than half of the total net costs of milk production on these farms. Nearly a ton of hay and 5 cwt. of straw were fed per cow in addition to 2 tons of roots. The quantities of silage, dried grass, sugar-beet pulp and grains used were negligible. Though home-grown foods accounted for more than half the cost of all food, nearly two-thirds of the average consumption of concentrates was purchased, and amounted to just over a ton per cow. Consequently an important consideration in the extent to which home-grown foods were supplemented by purchased cakes and meals, is the relationship of the productive capacity of the land, and the effect of purchased foods on the productive capacity of the cow.—A.D.H.

BRISTOL UNIVERSITY, Department of Economics. N/S. No. 51. **Notes on farm economics. Report on milk production costs 1947-48.** By *V. H. Beynon.* 1949. pp. 32. [Mimeographed] **1088**

Farms in the Bristol Province have provided data which have made it possible to calculate the estimated cost of producing milk on each individual farm as well as the aggregate cost for the whole sample. In addition, a considerable number of the home-grown fodder crops generally fed to dairy cows has been costed, since as much as 53.3 per cent of the total net cost of producing milk was expended on foods. Compound cakes and meals were fed to all but two of the herds, and the costs amounted to 80 per cent of the total expenditure on purchased foods. Straight cakes and meals together with these accounted for over 90 per cent of the total cost of purchased foods. The remaining 10 per cent was spent on wet and dried brewer's grains, dried grass, hay, straw, roots and green fodder, minerals and condiments. Hay was the mainstay of winter feeding. The cost of oats, mixed corn, kale and mangolds made up the bulk of the remaining charges for home-grown foods. The cost of producing grass-keep was an average £7 4s. 0d. per cow, or 2.80 pence per gallon.

Producers of T.T. milk secured a greater expenditure on foods, especially on home-grown foods due to the higher proportions of winter milk produced, and the higher yield per cow. As between hand-milked and machine-milked herds, though the cost of purchased foods and grazing were similar, there was rather a wide discrepancy in favour of the hand-milking group as regards the cost of home-grown foods.

There were wide variations in most individual items of cost between the lowest and highest cost producers, but the expenditure on foods revealed the greatest disparity. The difference can be attributed only to the excessive quantities of home-grown foods fed to the ten herds with high costs per gallon.

In addition, the appendix to this report gives a detailed analysis of the average annual cost of food and grazing in 1947-8, together with the aggregate and average annual quantities of foods fed to the herds.—A.D.H.

BRISTOL UNIVERSITY, Department of Economics. N/S. No. 46. **Notes on farm economics. Cost of production of crops, cropping year 1947.** By *C. V. Dawe.* 1948. [Mimeographed] **1089**

Tabulated data refer to costs of production of wheat, oats, mixed corn, potatoes, mangolds, kale and hay.—P.M.

THE HORACE PLUNKETT FOUNDATION. **Year book of agricultural co-operation 1948.** 21 × 14. pp. 322. Cambridge: W. Heffer and Sons Ltd., 1948. 15s. 0d. **1090**

WEST OF SCOTLAND College of Agriculture, Economics Department. Rep. No. 4—1948. **Cost of production figures for some fodder crops in south-west Scotland crop of 1947.** 1948. pp. 15. **1091**

CANADA, Department of Agriculture, Economics Division, Marketing Service. **Exports of Canadian farm products. War and post-war developments.** By *F. Skefrin*. 1949. pp. 72. [Mimeographed] **1092**

FOOD AND AGRICULTURE ORGANIZATION. **Yearbook of food and agricultural statistics, 1947.** Washington. 1947. pp. 267. [Received 1949.] **1093**

FOOD AND AGRICULTURE ORGANIZATION. **Program for the 1950 world census of agriculture.** Washington, 1948. pp. 96. **1094**

NEW YORK, United Nations Department of Economic Affairs. Economic Report. **Salient features of the world economic situation 1945-1947.** New York. 1948. pp. 369. **1095**

FOOD AND AGRICULTURE ORGANIZATION. **The state of food and agriculture—1948. A survey of world conditions and prospects.** Washington. 1948. pp. 216. **1096**

This work was prepared as a basic document for inter-governmental consultations on plans and programmes at the Fourth Session of the F.A.O. Conference in November, 1948. In the Foreword, the Director General notes that "the present Report, in spite of limitations and imperfections due to inadequate data, delineates the central uses clearly enough to enable governments to consult together and decide what practical steps should be taken next."

Part I, a world review, covers the current situation, outlook for the next 3 years, consumption goals, the battle for agricultural production, orientation of international trade. The special problems of the different regions of the world are considered in Part II, and Part III presents the current commodity situation. In Part IV some interim information on fertilizers and farm machinery is given.—P.M.

DAVIS, J. S. **On agricultural policy 1926-1938.** 23 × 15. pp. 500. Food Research Institute, Stanford University, California. 1938. 16s. 6d. **1097**

Many will regret that with his intimate knowledge of the economics of agriculture, the author has despaired "of finding time to write a systematic treatise on agricultural policy". Though a valiant attempt has been made to gather together this collection of talks, discussions, reviews and other articles into a coherent whole, the drawbacks inherent in such an attempt tend to detract from the clarity, incisiveness and continuity of the survey. A selective and discriminating index does, in part, help to overcome this difficulty, but unless each passage is read with a conscious appreciation of the purpose for, and environment in which it was written or spoken, the full significance of the matter will not be grasped. On the other hand the very fact that these articles are not contemporaneous, but were scattered over a period of some 12 years, presents an unusual and interesting side-light on the reaction of a critical and informed intelligence to changing circumstance, and the development of policy in the light of continuing experience.

The period covered was one of economic strain and stress, particularly testing for agriculture; a time when there were many schemes and suggestions for alleviating the distress into which the agricultural industry had fallen. In describing these, Mr. Davis does not allow enthusiasm to deflect his critical judgment—" The reformulation of America's agricultural policy . . . . . should rest upon sound analysis . . . . . a clear understanding of underlying trends and tendencies . . ." (p. 75), and he attempts to do this in the light of his own experience. His careful appraisal of agricultural fundamentalism [though " there is, I suspect, no magic in any given proportion of the population in agriculture, no inherent danger that the decline may go too fast or too far " (p. 85)], of the Debenture plan, of the Agricultural Marketing Act [" There is no panacea for agricultural ills, no magical device for insuring attractive prices regardless of the volume and costs of production " (p. 161)], of the working of the Farm Board, and the Agricultural Adjustment Act, all sound a note of caution and warning against hasty conclusions. This note is carried through his account of the wheat situation, which is particularly exhaustive and enlightening.

In his appraisal of results, he repeatedly emphasizes the misleading inferences that can be made. He denies that recovery must necessarily start with agriculture, or that a constant balance need be maintained between agriculture and industry; the maintenance of the *status quo* is both undesirable and impossible, indeed "we need better and fewer farmers," he says. Comprehensive solutions and policies cannot be formulated, he asserts, for, since " the horizon (of understanding) recedes as we progress," readjustment is constantly necessary. To this end he stresses the urgent need for improving research into agricultural policy, and suggests two significant tendencies as points worthy of study, namely, the tendency " to protect producers and stimulate production, rather than to protect consumers and stimulate consumption," and the tendency " to enhance national self-sufficiency even at heavy cost, rather than to reap the advantages of international division of labour." He urges, too, that more attention should be paid to net returns, which he considers more important than prices.

Throughout he stresses his belief that the Governments' function is to guide and re-adjust, not to compel and formulate economic forces; that the effects of agricultural planning tend to be exaggerated, because the influence of many other factors is neglected, and that insufficient knowledge is in danger of replacing bungling economic forces by even more bungling official management.

Though there will be some who will consider his concept unduly cautious, the note does not come amiss, particularly amidst the present-day enthusiasm for planning.—A. D. Hooper.

Uruguay, Ministerio de Ganaderia y Agricultura, Dirección de Agronomia. Publ. No. 90. Agronomia y Economia. Sobre unidad de los servicios técnicos. [**Agronomy and economy. On unity in the technical services.**] By *J. Murguia.* pp. 46. 1947. [Director of Agronomy, Min. Agric. Uruguay] **1098**

A review of official agronomic services in various countries and suggestions for organization in Uruguay.—G.M.R.

MACHINERY AND EQUIPMENT

Sweden, Institute of Agricultural Engineering. Medd. Nr. 222. Traktordragna redskapskärror för maskinstationer och lantgårdar. [**Tractor-drawn implement trailers for machinery stations and farms.**] By *G. Aniansson* and *T. Andersson.* [English summary, pp. 43-5.] 1949. pp. 46. **1099**

The bulletin includes a survey of the different types of transport devices which can be used by machinery stations and farms for moving implements and machinery, and also a description of the implement trailers which have been manufactured and tried out by the Swedish Institute of Agricultural Engineering.—R.P.J.

Wright, S. J. **Farm implements and machinery.** *J. R. agric. Soc.* **108.** 55-68. 1947. [The Croft, Great Warley, Essex] **1100**

Vitali, G. Nuova seminatrice da montagna. [**New seed-driller for the mountains.**] *Ann. Ente consorz. interprov. toscano Sementi* **2.** 145-9. 1940. [Received 1949.] **1101**

Farcas, A., and Ciomac, I. L. Mecanizarea agriculturii Românești. [**Mechanization of agriculture in Romania.**] *Anal. Fac. Agron. Cluj.* **12.** 2-42. [French summary, pp. 43-4.] 1949. **1102**

The evolution of mechanized agriculture is discussed, analysing economic, technical and social consideration as well as other influential factors. Information is given on the progress made in this field by more advanced countries and especially by the Soviet Union, where mechanization has reached a very high level, due to the planning and enthusiasm with which the Government and the peasant co-operate to make this science helpful to the entire nation. The different forms of mechanization and their adaptation to the different branches of agriculture are then discussed and also the actual existing Romanian supplies of these tools. Similarly the necessary supplies are estimated while present conditions are at the same time taken into account. Mechanization centres are mentioned with a view to future development on the most co-operative lines.

The conclusion shows that Romania is very short of agricultural machinery owing partly to the fact that owners of small properties have taken little or no interest in mechanization and partly to the high cost. Existing machinery is out of date and existing factories lack the necessary skill and equipment to produce better results. No satisfactory plan has yet been evolved to improve the situation, although the writer suggests various solutions.—From French summary.

Dworak, L. Bull. No. 6/8 State Exp. Inst. Plant Ind. Alapvetö kérdések tisztázása a produktiv talajmuvelési politikához. [**Soil cultivation in summer.**] Mosonmagyaróvár 1948. pp. 44. [English summary] **1103**

A discussion of the relative merits of the disk and the plough separately or together, with and without a harrow, with a suggestion that it is desirable to map those soils which are suitable for summer cultivation by disk and harrow respectively.—From English summary.

England and Wales, Ministry of Agriculture and Fisheries. Agric. Overseas Rep. No. 3. **Farm machinery in North America.** 1946. pp. 22. [Received 1949] **1104**

Turner, A. W., and Johnson, E. J. **Machines for the farm, ranch, and plantation.** 23 × 15. pp. 809. New York: McGraw-Hill Book Co. 1948. £1 16s. 0d. **1105**

Although intended primarily for the American market this book should be of tremendous value to the British farmer and agricultural engineer. The machinery dealt with is American, but with the increasing amount of mechanization on British farms and the basic principles of the machines of both countries being similar, there is no reason at all why this publication should not appear on most farm bookshelves in this country.

The authors state that their intention was to produce a work which should be informative, suggest procedures and methods and provide systematic instruction on the selection, operation, care and storage of farm machinery. They have succeeded admirably. There are four main sections dealing with seed-bed preparation machines, crop-planting machines, crop-tillage machines and harvest and harvest-handling machines. Each section is subdivided to cover selection, operating and field-servicing, reconditioning and storage of farm machinery. Technical terms are lucidly explained and the wealth of illustrations make even the most involved machine understandable to the reader. A comprehensive index completes this admirable work.—P. Mackintosh.

HEINRICH, O. H. **Farming and mechanised agriculture in Canada and the United States.** *J. Dep. Agric. S. Aust.* **52.** 259-76. 1949. **1106**

The author, a member of the Advisory Board of Agriculture, recently visited Canada and the U.S. This report gives an account of recent developments in agricultural machinery in these two countries. The report covers soil conservation, weedicides, tractors, tillage equipment, headers, fodder conservation machinery, dairy equipment. It is recommended that there should be closer co-operation with Canada and the U.S.A. and that certain mechanical equipment (named) should be imported immediately.—P.M.

SEEDS

ÅKERMAN, Å. Arbetsplan för Sveriges Utsädesförening för år 1949. [**Plan of work of the Swedish Seed Association for the year 1949.**] *Sverig. Utsädesför. Tidskr.* **59.** 43-87. 1949. **1107**

BATEMAN, A. J. **The contamination of seed.** *Farming* **3.** 106-9, and 118. 1949. **1108**

This article of interest to farmers and plant breeders describes the kinds of contamination (mechanical and by crossing) which may occur in the more usual farm crops. Crossing of crops may be prevented by isolation by time (that is, inducing crops, which would otherwise inter-cross to flower at different times) and isolation by distance. Tables are given of the degree of natural cross pollination, and the danger of contamination by crossing of insect and wind pollinated crops.—K.O.

ROBERTS, WINIFRED O. **Prevention of minera deficiency by soaking seed in nutrient solution** *J. agric. Sci.* **38.** 458-68. 1948. [East Malling Res. Sta. Kent.] **1109**

A method is described for economizing in the use of fertilizers by soaking the cereal seeds in nutrient solutions prior to sowing. The soaking and drying must be carried out under carefully controlled conditions and where this is done sufficient quantities of deficient elements can be introduced to carry the plant through the critica stages of early growth and to produce significant increases in yield.—T.D.H.

MULDER, F. Een en ander over "zaadteelt" [**Some observations on seed growing.**] *Maandbl LandbVoorlDnst.* **6.** 200-10. 1949. [Chief Asst., Agric. Adv. Service, North Groningen Netherlands] **1110**

By far the largest part of the agricultural seed produced in the Netherlands is grown in the northern province of Groningen, and growing is mainly in the hands of farmers under contract for the commercial breeders. The present article reviews the relations existing between the seed growers and the seed breeders, and gives an account of the many associations and organizations which have arisen to safeguard the interests of one or the other group and to maintain, also, a high standard of quality in the product. Attention is drawn to the Government services prepared to advise the grower, to test the seed and to conduct research into specific problems.—G.M.R.

FRANÇOIS, L. Semences et premières phases du développement des plantes commensales des végétaux cultivés. [**Seeds and first phases in the development of commensal cultivated plants.**] 1943. [Les Stations et Laboratoires de Recherches Agronomiques, Paris.] pp. 182. **1111**

This publication is the culmination of a series of studies extending over many years, starting with an initial paper in 1916, and being followed in 1919 by a small volume entitled "The seeds of cultivated plants and their determination", in 1928 by a second work, "The seeds of the adventitious plants in cereals", and by many subsequent works

After general introductory sections, the present work deals with the characteristics of the seeds and young seedlings of the plants which are to be found in association with crop plants such as cereals forage legumes and meadow grasses. One section contains some remarks pertaining especially to two species of *Cuscuta*, and there are some general considerations on questions of provenience. The text is profusely illustrated with photographs or drawings of wild seeds or seedlings, and maps of distribution of weed species in France. There is a useful bibliography of European works not generally familiar to English readers.—R. O. Whyte.

BALLATORE, G. P. L'ormonizzazione dei semi. Risultati di alcune prove di orientamento. [**Hormonal treatment of seeds. Results of some indicative trials.**] *Humus, Milan.* No. 8. 1948. pp. 3. **1112**

In laboratory trials kidney-bean seeds have been treated with solution of extracts of germinating embryos and with solution of β-naphthoacetic acid. A depressive action on germinability has been observed. In other trials seeds of several kidney-bean varieties have been treated with a heterauxinic compound, " Rootone " in powder. Several varieties have shown higher germinability and germination power, while for others the result was doubtful. The author believes that a definite conclusion on the matter can only be reached with field trials, which are still in progress.—E.B.

MCGUGAN, Jean M. **Seeds and seedlings of the genus** *Brassica. Sci. Agric.* **26.** 520-87. 1949. [Microanalyst, Plant Prod. Div., Dep. Agric., Ottawa] **1113**

The genus *Brassica*, with its numerous cultivated strains and weed varieties, presents a difficult problem to the seed analyst. A solution is attempted in this paper. Peculiarities of seed colour, shape and histology have been used wherever possible as diagnostic characters. In cases where these were found to require verification the characters of the young seedlings were used to supplement them. It has been found possible to distinguish the seeds or seedlings of plants so closely related as to be separated in adult form only by differences in the depth of the yellow colour in their roots and blossoms. Care has been taken to test the material for authenticity and to make sure that the seed and seedling characters chosen are closely linked in heredity with distinguishing characters of the species and varieties. A key for the identification of seeds of known varieties of *Brassica* has been evolved.—Author's Abstract.

INTERNATIONAL CROP IMPROVEMENT ASSOCIATION. Publ. No. 16. **Minimum seed certification standards.** 1946. pp. 64. **1114**

CANADIAN SEED GROWERS' ASSOCIATION. Circ. No. 6. **Regulations for the production of registered seed.** Revised edition. 1949. pp. 43. **1115**

NEW YORK STATE Agricultural Experiment Station. Bull. 735. **The quality of seeds on sale in New York in 1948.** By *M. T. Munn* and *A. B. Buchholz.* With an appendix on Legume inoculants tested in 1948 by *A. W. Hofer.* 1949. pp. 39. **1116**

A total of 2737 samples of agricultural, flower, shrub, tree, and vegetable seeds were purchased in the open markets of the State during 1948 by inspectors of the Bureau of Plant Industry of the State Department of Agriculture and Markets and were sent to the Experiment Station by the Commissioner of Agriculture, who is the executive of the seed law. Analyses, examinations, tests, and field trials were made at the Station and reported to the Department at Albany. Fifty-four samples of legume inoculants were similarly submitted for examination.

The agricultural seeds samples showed an increasingly improved condition with more hybrids, varieties and kinds, many of them certified. Of the 717 stocks samples, 167, or 23 per cent, did not meet the vendor's guarantee or lacked some legally required label item. Failure to indicate the noxious weed seed content and deficiencies in germinability were the most serious irregularities with false or irregular labelling of so-called " grass seed mixtures" offered for lawn seeding accounting for the greater part of the violations.

A total of 93 tests on 54 samples of legume inoculants revealed two unsatisfactory cultures. Individual inoculants were found to contain adequate numbers of the necessary bacteria in 95 per cent of the tests.—From Abstract.

PORTER, R. H. **Recent developments in seed technology.** *Bot. Rev.* **15.** 221-82 and 283-344. 1949. [Amer. International Assoc., Brazil] **1117**

Chapter headings of this review include: methods of seed identification; uniform method for determining purity of small-seeded grasses; a practical concept of pure seed; evaluation of weed seeds in crop seed; uniform evaluation of seed germination tests; impermeable seeds; dormant seeds; methods that prolong seed viability; rapid methods of measuring seed viability; relationship of hormones and inhibitors to seed germination; importance of seed-borne organisms in seed laboratory practice; seed fungicides in seed testing; laboratory methods for measuring seed germinability under adverse conditions; and application of statistical methods to seed testing.—D.B.

DISEASES, PESTS AND PARASITES

JAMALAINEN, E. A. Boorin puutteesta aiheuturista kasvitaudeista ja boorin merkityksestä maamme kasvinviljelyssä. [**On boron deficiency diseases and on the role of boron in the Finnish plant cultivation.**] *Valtion Maatalouskoetoiminnan Julkaisuja* No. 130. 1949. pp. 48. [English summary pp. 43-8] [Agric. Res. Inst., Dept. Plant Pathology, Tikkurila, Finland] **1118**

The data available indicate that in large areas of Finland field and garden crops require the application of boron in order to produce good yields. Boron deficiency diseases were frequent in the swede and sugar-beet cultivations in south Finland when manuring of the fields was liberal and one-sided.

In the sugar-beet experiments at the Carelian Agricultural Experiment Station at Hannila boron was the minimum factor. In the limed plots left without boron, the crop yields were, due to dry rot, in some instances even smaller than in the unlimed. The boron-treated plots were not affected by dry rot or only slightly so, and spectacular increases in yield were obtained, particularly in the plots with heavy PKN manuring.

Boron manuring is closely associated with the problem of liming and the use of mineral fertilizers. When boron was at the minimum, neither liming nor the application of mineral fertilizers produced the desired results.

In experiments with swede and sugar beet, acidity of the soil did not prevent the appearance of boron deficiency diseases. Brown heart of swede occurred in every case investigated in fields with a pH value below 7. In the Carelian Agricultural Experiment Station dry rot was wide-spread in sugar beets in every experiment in which the pH value of the soil was between 5 and 6.

According to information available at present the cultivation of sugar beet in Finland is in many cases uneconomic unless the plants are supplied with boron. This holds good for other boron-deficient plants in the districts where the soil is lacking in boron or heavily limed. The mixing of boron fertilizers with the seeds of sugar beet, a practice common in Finland, is not to be recommended.—R.P.J.

Salt, G. and Hollick, F. S. J. **Studies of wireworm population. III. Some effects of cultivation.** *Ann. appl. Biol.* **36.** 170-86. 1949. [Zool. Lab., Univ. Cambridge] **1119**

[See also *Herb. Abstr.* 14. Abs. 1646 ; 17, Abs. 366]

The number of wireworms in successive collections from five Cambridgeshire fields declined during the first year of cultivation to 25 per cent of the number present before the fields were ploughed from old grass. The decline in numbers was accompanied by a change in the composition of the wireworm population ; the marked inverse correlation between number and size of larvae, which held for the wireworm populations under grass, progressively altered towards uniform numbers of the different size groups.

Three groups of factors are considered as contributing to the decline in numbers after ploughing. Direct observation showed that many wireworms were destroyed in the actual process of cultivation. Evidence was insufficient to prove that the physical condition of cultivated soil adversely affects the number of wireworms. Comparison of the smaller size groups in pasture and in the cultivated fields showed that the wireworm population failed to replenish itself under arable conditions.—From authors' introduction.

Potter, C. **Modern insecticides and methods of application for plant protection.** *J. R. agric. Soc.* **109.** 175-93. 1948. [Rothamsted Exp. Sta., Harpenden] **1120**

Flipse, L. P. Plantenziekten als gevolg van storingen in de voedselopname. [**Plant diseases resulting from the disturbance of nutritional uptake.**] *Maandbl. LandbVoorlDnst* **6.** 134-47 and 172-4. 1949. [Phytopathological Service, Netherlands] **1121**

A study of the so-called deficiency diseases and their complications, with ample reference on pp. 172-4 to recent literature.—G.M.R.

ГРУШЕВОЙ, С. Е. Перспективы использования многолетних бобовых трав в борьбе с заразихой и черной корневой гнилью в табачном севообороте. *Доклады Всесоюз. Акад. С.-Х. Наук* 1949. *No.* 2. стр. 17-21.

Gruševoǐ, S. E. [**The possibility of using perennial leguminous herbage for control of** *Orobanche ramosa* **and black root rot** (*Thielavia basicola*) **in tobacco rotations.**] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1949. No. 2. 17-21. [Crimean Expt. Sta., All-Union Sci. Res. Inst. for Tobacco Crops] **1122**

The usual tobacco rotation includes sowings of legume herbage and grain crops. There is some possibility that grains may be attacked by the above predators of tobacco, but perennial herbage legumes are immune and therefore their production in rotation is a means of controlling tobacco infestation. Details are given of percentage reduction in attack of tobacco crops through cultivating different varieties of clovers. For example, germination of *Orobanche* seed was reduced from 100 per cent in a fallow control plot to 23.9 per cent in the area growing *Trifolium pratense* var. 343. The following data obtained in 1934 from the Novo-Ušick Substation show percentage attack on tobacco by *Thielavia basicola* under varying systems : 7-year tobacco without fertilizer, 94.0 ; 7-year tobacco without fertilizer for 5 years, with fertilizer in 6-7th year, 66.5 ; 7-year tobacco, 5 years with fert., 6-7th year without, 87.0 ; 7-year tobacco with fert., 61.1 ; 4-year tobacco with lucerne sowing, 44.1 ; 4-year tobacco with clover sowing, 44.9 ; 3-year tobacco with ploughed-up lucerne 24.1 ; 3-year tobacco with ploughed clover 22.9.

In the areas where *Th. basicola* is prevalent on field crops of tobacco, namely, Abhazia, Black-Sea coastal regions, the foot-hills of Krasnodar province, and parts of the forest-steppe area in the Ukraine, clover should be included in the rotation. Lucerne in the rotation for tobacco is recommended in the valleys of Krasnodar province, Southern Transcaucasia, Central Asia and Crimea where *Th. basicola* does not develop.—M.H.

ОВЧАРОВ, К. Е. Применение ростовых веществ для борьбы с заразихой (*Orobanche aegyptiaca* Pers.) *Доклады Акад. Наук СССР* Том 59. *No.* 1. стр. 183-5. 1948.

Ovčarov, K. E. [**Growth substances for control of** *Orobanche aegyptiaca* **Pers.**] *Doklady Akad. Nauk SSSR* **59.** 183-5. 1948. [Timirjazev Inst. Pl. Physiol., Acad. Sci., USSR] **1123**

Many agrotechnical measures have been advocated for the control of this pest, such as weeding out before flowering, deep ploughing, use of a crop rotation which includes non-susceptible host plants such as lucerne or grain crops. The author has tested the application of 2,4-D α and β-naphthoacetic acids in the concentrations 0.001, 0.01 and 0.1 per cent. The greater the concentration, the more complete is the destruction of the parasite, 100 per cent elimination being obtained with 0.1 per cent concentration of any of the three substances, but the most effective is 2,4-D which results in 100 per cent destruction after 15 days at a concentration of only 0.001 per cent, i.e. 10 mg. per litre of water.—M.H.

Hell, W. F. van. **Phytopathology in Switzerland.** *Chron. Nat., Batavia* **104.** 105-11. 1948. [Phytopathologist, A.V.R.O.S. Exp. Sta., Medan, Sumatra] **1124**

An account is given of the organization of plant protection in Switzerland, with special reference to its rapid development during the war, to the patenting and use of DDT, the use of dinitro-ortho-cresol, and the organization of scientific tests.—G.M.R.

Ciferri, R. Gli esteri fosforici quali insetticidi. [**Phosphoric esters as insecticides.**] *Humus, Milan* **5.** No. 4. 14-6. 1949. **1125**

This article summarizes up to date information on these insecticides and particularly on the compound more widely known as " Parathion " (known also as " New Bladan," " Bayer E 605 ", " B 404", and " R.B. 1018). It is used for the control of a wide range of plant insects, and has also a limited action against fungi.—E.B.

Chiaromonte, A. L' " *Achaea catella* Guen." nella Somalia Italiana. [" *Achaea catella* **Guen.**" **in Italian Somaliland.**] *Riv. Agric. subtrop. e trop.* **42.** 181-6. [English summary, 185-6.] 1948. **1126**

The larvae of this insect cause serious damage to *Ricinus* plants (leaves and young stems are completely destroyed). Treatment with insecticides containing 1 per cent lead or calcium arsenates is advised. Cultivation disturbs the chrysalides.—E.B.

Wilson, M. C. **Tests for the control of corn flea beetles.** *Proc. Ind. Acad. Sci.* **57.** 111-5. 1947. **1127**

The corn flea beetle (*Chaetocnema pulicaria* Melsh.) is a troublesome pest to corn growers for two reasons. Firstly it eats the young plants, retards growth and may cause a whole crop to be devastated by its feeding alone. In the second place it functions as the vector of Stewart's disease of corn, the causal organism (*Phytomonas stewarti*) of which can overwinter only in the body of the insect. Trials were carried out with numerous dusts to determine an effective means of controlling the beetle. Highest control was obtained from the use of benzene hexachloride and chlordane, a 1 per cent gamma isomer of the former and a 2.5 per cent dust of the latter effected a higher control than a 5 per cent DDT dust.—T.D.H.

Davis, J. J. **New chemicals for insect control.** *Proc. Ind. Acad. Sci.* **57.** 119-22. 1947. **1128**

A brief review of some of the chemicals which have shown most promise in pest control during the past few years is given. The author points out that though these chemicals have numerous advantages they do have their limitations and the user must know these and use accordingly. The need of a thorough understanding of the life history, habits and structure of the pest in question is emphasized if complete control is to be achieved.—T.D.H.

Weddell, J. A. **Black aphids invade south-eastern Queensland.** *Qd agric. J.* **67.** 267. 1948. **1129**

Recommended control measures are :—on crops other than tomatoes a spray containing hexaethyl tetraphosphate (HETP). On tomatoes, HETP should not be used. With this crop, the most satisfactory spray is nicotine sulphate and should be mixed as 1 fluid ounce nicotine sulphate, 3 ounces soap, 5 gall. water.—P.M.

Weddell, J. A. **Control of army worms.** *Qd agric. J.* **67.** 266-7. 1948. **1130**

A bait, spread along the line of the front of the advancing pests [*Leucania unipuncta*] and a few feet wide in advance of it, is recommended as a control measure. The bait should consist of 1 lb. Paris green, 25 lb. dry bran, 1 qt. molasses and 2 gall. water. An alternative control method is a DDT spray at a strength of 0.1 per cent DDT, or DDT dusts may be applied.—P.M.

Cornell University Agricultural Experiment Station. Bull. 850. **Soil fumigation for nematode and disease control.** By *A. G. Newhall* and *B. Lear*. 1948. pp. 32. **1131**

See *Soils and Fertilizers*.

WEEDS

Vidme, T. Våre nye våpen i ugraskampen. Hvor kan de settes inn med størst fordel? [**Our new weapons in the fight against weeds. Where can they be used with greatest advantage?**] *Norsk Landbr.* **15.** 174-9. 1949. **1132**

A list of new herbicides tested and recommended by Norwegian research institutions in soil and plant cultivation for the control of weeds in specified crops.—R.P.J.

Von Hofsten, C. G. Ogräs och växtskydd. [**Weeds and plant protection.**] *Lantm. Svenskt Land* **33.** 300-1. 1949. **1133**

An account of tours in Denmark in the winter of 1948-49 to study qustions concerning weeds and plant protection.—R.P.J.

Greve, M. Om Brugen af Hormonmidlerne i Kampen mod Ukrudtet. [**The use of hormone preparations in the control of weeds.**] *Ugeskr. Landm.* **94.** 316. 1949. **1134**

The preparations produced hitherto can be divided into two groups: (1) 2,4-D to which Herbatox D, Weedone Salt etc. belong, and (2) 2 M4K to which Dicotox, P. 46, Herbatox M and Weedex K. belong.

The preparations in group (1) are suitable for use in grass seed plots to control red clover, and to check dandelions in lawns. Those in group (2) are used to control weeds in linseed: they can also be used with advantage on very weedy red clover seed plots when treatment is carried out comparatively late and the concentration of the liquid does not exceed 1 per cent. They should never be used on white clover seed plots. *Medicago lupulina* and *M. sativa* are completely destroyed, and seed roots are very seriously damaged by spraying with hormone preparations.—R.P.J.

Grøntved, P. Den kemiske krig i marken nu i foraarstiden. [**The chemical war in the field now in the springtime.**] *Ugeskr. Landm.* **94.** 327-30. 1949. **1135**

The greater effectiveness of hormone derivatives in the control of weeds compared with earlier chemical preparations is emphasized. The question of control of such weeds as *Triticum repens* and *Avena fatua* has not yet been solved satisfactorily. —R.P.J.

Breitenstein, W. Kemiska preparat i kampen mot ogräsen. [**Chemical preparations in the control of weeds.**] *Tidskr. Lantm.* **31.** 88-91. 1949. **1136**

Results obtained in Sweden with hormone derivatives are reported, and a table is included indicating the susceptibility of cultivated plants and weeds to these preparations.—R.P.J.

Bates, G. H. **Weed control.** 22 × 14. pp. 244. London: Farmer and Stock Breeder Ltd. 1948. 16s. **1137**

As the author points out in the introduction, the well-known maxim " prevention is better than cure " is still appropriate when applied to the problem of weeds and their control. Despite considerable developments in the field of chemical weed-killers, sound methods of husbandry involving good cultivations and the growing of full crops remain the surest and cheapest means of maintaining our farm lands free from weeds. It is refreshing to find, too, that progress in weed control has not been confined to chemistry—that new and improved cultivation methods, e.g., the pre-emergence flexible harrowing of sugar beet and mangolds, still give scope for the skill of the husbandman.

Until recent years, surprisingly little research on weed problems has been carried out in this country; the literature on the subject is correspondingly limited. With this book the author sets out to " close the gap " and to bring together present-day knowledge on all aspects of this subject. The outcome of this difficult task is almost completely successful, resulting in a comprehensive study of relevant problems discussed with clarity, despite the technical nature of much of the material. The author himself is well known for his work on weed control and this volume embodies much sound advice based on his wide experience.

The various chemical and cultural methods of control are outlined, though certain aspects of the former—the use of " hormone " weed-killers and the spraying of undersown cereals for instance—are not, perhaps, given due consideration. The main weeds of grass and arable land are indicated and recommendations made for their eradication. The author continually emphasizes the importance of the environmental conditions which predispose to infestation by specific weeds and suggestions for control are based on these ecological considerations. A chapter on spraying appliances and devices and their uses could be read with profit by many contractors. Photographs or diagrams would have been useful in this section, particularly to illustrate what is called the " smear method " device for eradicating bracken, creeping thistle and similar weeds.

The weeds of such uncultivated land as railways, hedgerows and pit mounds are considered in relation to the national economy, emphasis again being given to control measures. The specific weed problems of horticulture are also discussed.

A short appendix sets out the main terms of the Seeds Act, 1920, and the Injurious Weeds Order, 1921, while a considerable list of references is reserved till the end of the book.

This, then, is a first-class book which can be recommended either as a text book or as a practical handbook, and it should be widely read and appreciated by students, farmers, advisory officers and many others.—G. R. Cooke.

HOLMES, E. **Up-to-date weedkillers.** *J. Fmrs' Cl. Lond.* No. 1. 1949. 1-14. **1138**

Weed killers can be divided broadly into two classes, those toxic to all forms of vegetation and those that are selective. This paper deals with the latter class, and gives a description of the research into plant growth regulators which in a very short time led to the discovery of " hormone " weed killers.

Methoxone (MCPA) and 2,4-D (DCPA) are both discussed, the sodium salts of MCPA and DCPA being cheapest and safest. The esters of MCPA and DCPA are more expensive, less selective and more effective. The amines of MCPA and DCPA are intermediate between these two. The sodium salts are perfectly adequate for use in this country though they are insufficiently soluble for use in low volume methods of application.

The cost of application varies from 25 shillings to 55 shillings per acre depending on whether the farmer applies it himself or uses the services of a contractor.

The increases in crop yield vary from nothing on a lightly infested field to the saving of a complete crop which is so badly infested that it would otherwise have to be ploughed in.

Dealing with specific uses, yellow charlock, white charlock and pennycress are easily killed in cereal crops by the application of 1 to 2 lb. of active material (MCPA) per acre. Thistles and docks, the latter being rolled first to bruise them before application, require 2 lb. per acre. Linseed and flax have to be treated with care and the use of low volume sprays has yet to be satisfactorily investigated.

Dusts are safer than sprays on peas. The weedkillers are dangerous for use near sugar beet, beans and brassica crops and may also cause a small percentage of malformed ears on Scandinavian barley varieties such as Abed Kenia.

A detailed table of the susceptibility of common British arable and pasture weeds to " Agroxone " (containing MCPA), giving the susceptible, moderately susceptible and moderately resistant weeds, and remarks on the effect of varying concentrations on them are given.

Arising from questions on the paper, are, the use of dormancy breakers to control wild oats, DNOC for control of cleavers, dinitro-secondary-butyphenol for control of weeds in peas, the use of a standard nomenclature, the fact that " hormone " weed killers (MCPA and DCPA) do not act as insecticides, and the comparative value of pre- and post-emergence spraying. See also Abs. 793.—G.M.W.

БЕЛОЗЕРОВ, П. И. О всхожести семян сорных трав, извлеченных из пахотного слоя почвы. *Доклады Всесоюз Акад. С.-Х. Наук* 1949. Вып. 1. стр. 33-8.

BELOZEROV, P. I. [**Germination of herbage weed seeds from the ploughed layer of soil.**] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1949. No. 1. 33-8. [Vologda Agric. Inst.] **1139**

An earlier investigation made on weedy soil in the north during the period 1933-41 showed that the ploughed soil layer in the Vologda region contained 90 to 300 million weed seeds per hectare. Reference is made to the work already done by Kott (*Herb. Abstr.* 17, Abs. 369) and it is stressed that viability should be studied of fresh seed and of that which has been in the ground for some time. The author's tests have been on germination capacity of weed seeds which accumulate in the soils of the north, in particular of the Vologda Province, and to determine the germination of the more widely distributed individual weeds. The samples were collected in each of the years 1934 to 1939. The sample collected in 1934 was thus stored (dry) for 5 years before the germination test was made, and only the 1939 sample was tested without preliminary storage. Germination was studied in a thermostat, at 18-25° on filter paper and on quartz sand, with the following plants: *Polygonum tomentosum, P. aviculare, P. convolvulus, Chenopodium album, Spergula arvensis, Stellaria media, Thlaspi arvense, Rumex acetosella* and species of *Viola, Myosotis, Galeopsis* and *Centaurea.* The samples showed an average germination capacity (mostly in the first 2 months) of 20 to 30 per cent, but some of the seeds (*Polygonum convolvulus, P. tomentosum, Chenopodium album* and *Viola* sp.) remained viable without germinating. It is assumed that some property of the soils concerned determines germination capacity. Prolonged dry storage also affects germination adversely in some species.—M.H.

RADEMACHER, B. Erfahrungen über Nachwirkung von Natriumchlorat auf die Kulturpflanzen. [**Experience in the after-effect of sodium chlorate on cultivated plants.**] *Dtsch. Landw.* No. 45. 1-6. 1940. [Received 1949.] **1140**

SCHMITZ, A. La répartition et la fréquence des plantes commensales des cultures en fonction du pH du sol en Belgique. [**Distribution and frequency of weed plants in crops in relation to the soil pH in Belgium.**] *Bull. Inst. agron. Gembloux* **15.** 18-78. 1946. [Dutch, German and English summaries pp. 77-8.] **1141**

The earlier work of Arrhenius, Olsen and Goedewaagen, is reviewed. For the present investtigation information was obtained from plant sociological surveys. The coefficient of abundance-dominance was correlated with soil pH of the site in a number of observations of more than forty frequently encountered species and more than eighty rarely encountered ones. The frequently encountered species are tabulated to show the pH group in which they most characteristically occur. Plants rarely encountered are classified according to their usual occurrence, i.e. in acid, neutral or basic soils. Some are indifferent to the pH of the soil. The author describes a method for determining soil pH from the presence and abundance of the adventitious flora as obtained from phytosociological surveys.—D.B.

KUHNHOLTZ-LORDAT, G. and BARRY, J. P. De la dédifférenciation sous l'action de l'acide 2 méthyl-4 chlorophénoxiacétique (M.C.P.A.). [**Modification under the influence of 2-methyl-4-chlorophenoxyacetic acid.**] *Ann. Agron. Paris* **18.** 471-83. 1948. [Bot. Lab., Nat. School of Agriculture, Montpellier] **1142**

Studies have been made in the changes which take place in several weed species. Those plants which showed the most characteristic external modifications were studied histologically, effects on collenchyma and schlerenchyma are described.—D.B.

ZANINI, E., and BALLATORE, G. P. Primi risultati di alcune prove di orientamento sull'impiego degli erbicidi selettivi. [**First results of some indicative trials on the use of selective herbicides.**] *Lav. Ist. bot. e Giard. col. Palermo* **13.** pp. 20. 1948. **1143**

Trials have been carried out in Sicily in order to test some heterauxinic herbicides (the Weedone and the sodium salt of 2,4-D) and some chemical herbicides (Supersinox and Stirpanpulver, which are based on dinitro-O-sodium cresolate). Under the conditions of the experiments, all these herbicides have proved more effective on dicotyledonous plants with large leaves, while the monocotyledonous plants, and particularly the spontaneous Gramineae, have proved resistant. Weedone has destroyed the following species: *Achillea millefolium, Anagallis arvensis, Asarum europaeum, Calendula maritima, Chrysanthemum miconis, Chrysanthemum* sp. *Cichorium intybus, Convolvulus althaeoides, C. arvensis, Hedysarum coronarium, Lathyrus ocrus, Malva rotundifolia, Mercurialis annua, Papaver rhoeas, Sinapis alba, Sonchus oleraceus, Taraxacum officinale* and *Vicia* sp. Almost all these species are also destroyed by Supersinox and Stirpanpulver. The last one has proved effective also on *Chrysanthemum coronarium* and *Euphorbia dendroides*. Weedone destroys flax and seriously damages wheat. Supersinox and Stirpanpulver have only a slight action on wheat. The authors conclude that, for the present, mechanical weeding cannot be subsituted by chemical and hormonal herbicides.—E.B.

HUBERT, B. Onkruidbestrijding. [**Weed control.**] *Chron. Nat., Batavia* **104.** 306-10. 1948. **1144**

A short review of recent progress in weed control, with special reference to the use of 2,4-D and to the biological control of *Opuntia* spp. in Australia as described by A. P. Dodd in Bull. 27 Imp. Bur. Pastures For. Crops, 1940.—G.M.R.

JOHNSON, A. **Selective hormone-type weedicides.** *Agric. Gaz. N.S.W.* **59.** 581-3. 1948. **1145**

The times and methods for the successful application of methoxone and 2,4-D preparations to weeds among cultivated crops are stated briefly. A useful summary of the results of tests conducted in many parts of New South Wales lists a large number of susceptible, moderately susceptible and resistant plants.—M.E.E.

ORCHARD, H. E. **Weeds of South Australia. Dyer's Weed** (*Reseda luteola*, **L.**) **and related species.** *J. Dep. Agric. S. Aust.* **52.** 277-8. 1949. **1146**

Dyer's Weed has been proclaimed a noxious weed for the whole of the State of South Australia. Brief notes, covering description, common and botanical names, distribution and properties are given. The weed can be eradicated by a number of chemicals in solution, sprayed into the growing plant. Sodium chloride or Atlacide, arsenic pentoxide, sodium arsenite, methoxone and Weedone have all proved effective. Short notes are also given on some related species which include Cut-leaved Mignonette (*Reseda lutea* L.), White Mignonette (*R. alba* L.) and Common Mignonette (*R. odorata* L.).—P.M.

LYNCH, P. B. **Chemical methods of weed control.** *N. Z. J. Agric.* **77.** 437-44. 1948. [Dept. Agric., Wellington] **1147**

Hormone weedkillers, DNOC base compounds, sodium chlorate and power kerosene are the chemical weed-killers recommended by the Sub-committee for Chemical Weed Control in New Zealand. It is emphasized that weed control with chemical weed-killers should be regarded not as a means of avoiding clean farming practice, but as a means of obtaining clean crops and pastures when circumstances have made these difficult or impossible to attain by normal farming practices. In many cases the cost of using chemical weed-killers makes them uneconomic to apply except to high-value crops. The possibility of direct damage to the crop plant itself must also be considered.—J.T.B.

ILLINOIS Agricultural Experiment Station. Bull. 525. **Experiments in eradicating field bindweed.** By *L. V. Sherwood* and *R. F. Fuelleman*. 1948. 473-506. **1148**

A description of the life-history, identification, seed production and rooting habits of field bindweed (*Convolvulus arvensis*) is given.

The spread is both by root system and seeds. Details of results of methods of control by smothering and burning, destroying with chemicals and by cultural methods are described.

Established roots can be eradicated in two growing seasons by bare fallowing or clean cultivation of an intertilled crop. Cultivations should be made 10 days after the young plants emerge, 3 to 4 inches deep using sweep-type cultivators with overlapping blades.

Seeds in the soil can be eliminated by encouraging them to grow and then destroying the resulting seedlings by a shallow cultivation before they are 2 weeks old. Sprays of 2,4-D have proved particularly effective in the prevention of seed production, one treatment of it when applied to bindweed in the bud stage, preventing the formation of seeds.

Chlorates have been effective in eradicating the weed and are recommended for small areas and places which cannot be reached by cultural equipment ; 3 to 5 pounds per square rod are needed. Small infestations should be eradicated as soon as they appear, and special effort should be made to avoid introducing bindweed seed in crop seeds, feeds, manures, neighbourhood threshing machines and other farm equipment.—G.M.W.

WASHINGTON State College. Bull. No. 505. **Controlling perennial weeds with sodium chlorate, carbon bisulphide and borax.** By *C. I. Seely*, *K. H. Klager* and *E. G. Schafer*. 1948. pp. 23. **1149**

A concise and practical account of these non-selective weed killers, under the headings : history, description and precautions in use, grades of chemical, limitations, soil sterility, date of application, rate of application to control common perennials, method of application, hand and machine preparing the ground for treatment, follow-up treatment and seedling control. Price considerations limit the use of these chemicals to small areas where the primary consideration is the protection of large areas of uninfested land.—K.J.S.

TIMMONS, F. L. **Duration of viability of bindweed seed under field conditions and experimental results in the control of bindweed seedlings.** *Agron. J.* **41.** 130-3. 1949. **1150**

The seed of bindweed (*Convolvulus arvensis*) retained its viability for more than 22 years after remaining dormant in the soil. Comparisons of the effect of various rotations show that the use of vigorously growing close-drilled annual crops is most effective in controlling bindweed. Winter wheat and close-drilled sorghum grown every year or in rotation with summer fallow or row sorghum, supplemented by monthly cultivation when the land was not in crop gave the most satisfactory results.—T.D.H.

OVERBEEK, J. van, and VELEZ, I. Erradicación de malas yerbas en Puerto Rico con 2,4-D. [**Eradication of weeds in Puerto Rico with 2,4-D.**] *Rev. Agric., Costa Rica* **19.** 109-44. 1947. [Inst. Trop. Agric., Mayagüez, Puerto Rico] **1151**

A discussion of results obtained in Puerto Rican trials. The weeds listed are divided into four classes according to their sensitivity to 2,4-D. See also *Herb. Abstr.* 17. Abs. 1160.—G.M.R.

CEREALS

CIFERRI, R., and GIGLIOLI, G. R. I cereali dell'Africa Italiana. 1. I frumenti dell'Africa Orientale Italiana studiati su materiali originali. [**Cereals of Italian Africa. 1. Wheats of Italian East Africa studied on original materials.**] 1939. 24 × 17. pp. 307. Firenze : Istituto Agronomico per l'Africa Italiana. [Received 1949] **1152**

CIFERRI, R., and BALDRATI, I. I cereali dell'Africa Italiana. 2. Il "Teff" (*Eragrostis Teff*) Cereale da panificazione dell'Africa Orientale Italiana montana. [**Cereals of Italian Africa. 2. "Teff" (*Eragrostis tef*) baking cereal of the mountainous Italian East Africa.**] 24 × 17. pp. 113. Firenze : Istituto Agronomico per l'Africa Italiana. 1939. [Received 1949] **1153**

CIFERRI, R., and GARAVINI, M. I cereali dell'Africa Italiana. 3. I frumenti oasicoli del Sahara libico. [**Cereals of Italian Africa. 3. Wheats of the oases of the Libyan Sahara.**] 24 × 17. pp. 155. Firenze : Istituto Agronomico per l'Africa Italiana. 1941. [Received 1949] **1154**

FOOD AND AGRICULTURE ORGANIZATION. Comm. Ser. No. 10. **Grain Bulletin.** Washington 1949. pp. 100. **1155**

"This commodity bulletin reviews the important aspects of the 1948/49 world grain situation and gives a statistical appraisal of supplies and requirements. It also discusses the feed supply position in Europe, which is an important aspect of the current world grain situation, as this is the first year since the end of the war that livestock rehabilitation could be actively emphasized in world food-programming activities. A special feature of the bulletin is a review of the activities of the Committee on Cereals, which was first established under the Combined Food Board and now operates as a commodity committee of the International Emergency Food Committee. This Committee has been closely related to the movement of grain in world trade during the war and post-war years. Some special notes on the outlook for 1949/50 and later years call attention to factors in the world grain situation that are often overlooked and to the need for constructive thinking about them.

The statistical appendix to the bulletin contains the latest information on area and production as reported by member countries and a series of world trade tables that bring together for the first time a great deal of trade data on a world basis and by countries of destination. It also contains statistical tabulations on many other aspects of the world grain situation and a number of maps that show some special features of the position for the various grains."—Extract.

GANDOLFO, A. B. El cultivo de los maices cusqueños en la Sierra del Centro. [**The cultivation of the Cuzco maize varieties in the central Sierra, Peru.**] *Inf. téc. SCIPA Peru* No. **35.** 1948. pp. 10. [Mimeographed.] [Inter-American Cooperative Service for Food Production, Min. Agric., Huancayo, Peru] **1156**

Maize growing occupies some 50,000 hectares in three Departments of the central, Andean region of Peru. The area is situated at altitudes ranging from 7500 to 10,200 ft. There are risks at both ends of this altitude range, at the lower that of too luxuriant vegetative growth and at the higher that of frosts, but the regional varieties are adapted to their environment and have a short growing period of 7 to 7.5 months, which protects them more or less from the action of frosts. These varieties constitute, however, a very complex hybrid population lacking any kind of uniformity and giving relatively poor yields of 1200 to 2000 kg. per ha. It is believed that they could be profitably replaced by the much more productive Cuzco varieties. Five of these are described and information is given on their soil requirements and on cultural and manurial technique, including irrigation. Finally an account is given, with special reference to costs, of a trial of the white-grained Cuzco variety in the Mantaro valley at an elevation of nearly 10,000 ft., the climate being dry and cold. The trial was successful and has been of propaganda value, and 4000 kg. of select seed have been produced for the use of the Tarma region, which supplies Lima with large quantities of maize.—G.M.R.

WERTH, E. Der Hafer, eine urnordische Getreideart. (Zur Geographie und Geschichte der Kulturpflanzen und Haustiere XXV). [**Oats. Originally a northern type of cereal. Geography and history of cultivated plants and domestic animals. XXV.**] *Z. Pflanzenz.* **26.** 92-102. 1944. [Received 1948] **1157**

NYASALAND PROTECTORATE, Department of Agriculture. Bull. No. 12 (New Series). **The rices of Northern Nyasaland.** By *F. Barker.* 1934. pp. 15. [Received 1949] **1158**

TREWARTHA, G. T., and YANG, SHOU-JEN. **Notes on rice growing in China.** *Ann. Ass. Amer. Geogr.* **38.** 277-281. 1948. [Univ. Wisconsin.] **1159**

Irrigated rice is the staple food crop in China south of about latitude 32° or 33°. Within this extensive region there are two major subdivisions based upon cropping practices: a northern and much more extensive one where there is a single rice harvest, and a southern one where there are two successive crops. As far as is known, only Hainan Island produces three crops of rice and even there the practice is rare. Seventy to 80 per cent of the acreage of the two-rice-crop paddies is characterized by the successive-crop practice. However, the intercropping method of growing two crops of rice has been increasing in importance in recent years. The two other methods—mixing of early- and late-maturing varieties, and regeneration from an earlier crop composed of medium-maturing varieties—are of minor importance.—Authors' summary.

HUET, G. La riziculture traditionnelle en Cochinchine. [**Traditional rice cultivation in Cochin-China.**] *Agron. trop.* **4.** 25-49. 1949. **1160**

Rice fields are thus defined (a) sound fields, (b) slightly salty and (c) very salty fields, the last being situated mostly along the coasts. Cultural systems in relation to toxic causes are discussed. Rainfall exclusively supplies the higher regions with necessary water and elsewhere it is supplied by the rise of tidal rivers. The water régime is described and cultural methods explained. The rice varieties are distinguished according to the length of vegetative period and to the season in which grown, the choice of a variety being dependent on water availability. Systems of water management are dealt with in the last part of the article.—E.B.

Holt, A. J. **Wheat farms of Victoria. A sociological survey.** 22 × 14. pp. 194. Melbourne. The School of Agriculture, University of Melbourne. 1947. **1161**

Rural sociology is an important but very little investigated subject, and this study will therefore prove most useful to those who wish to put economic information to a practical test. The general method of the survey was to investigate the farming conditions and standard of living on a small number of farms over the entire area of the wheat belt and a total of 150 farm units, or one farm unit in every fifty, was selected for interview. The wheat belt was divided into thirteen zones within which wheat-producing parishes were chosen at random to provide sample farms for the survey.

After a brief historical sketch of farming settlement in the three chief districts of the Mallee, Wimmera and Northern District, the main chapters of the book are concerned with the farms and what they produce, farm population, housing, domestic amenities, work and leisure, external services and social organizations.

Outstanding among the disadvantages recognized by the author of farm life in these wheat lands is the isolation. From the many tables, charts and maps which form a conspicuous and worthy part of this book, the reader cannot fail to be impressed by the repercussions that this isolation has on the life of the people. Long distances to ordinary amenities are prohibitive both in time and cost, and the sparse distribution of population mitigates against improvements which the advent of quicker transport and communication facilities have made available.

Remedies for greater farming efficiency in this part of Victoria include more mechanization and larger farm units which would abolish the " one-man " farm pattern. Determination of a minimum farm wage and the agglomeration of wheat farm households are other suggestions for improving farm life and enabling the wheat farmer to play a full share in the life of the community.—M. E. Edwards.

New Jersey Agricultural Experiment Station. Bull. 743. **Growing winter wheat in New Jersey.** By *R. S. Snell et al.* 1948. pp. 27. **1162**

Experiments with wheat varieties under way are discussed and tables of grain and straw yields of varieties under examination are given. Thorne wheat was found to average best in grain and straw yield and lodging resistance of any of the soft red winter wheats under trial, Cornell No. 595 was best of the soft white wheats.

No relation was found between height and lodging—a table of heights is given.

Diseases were insignificant, but Hessian fly was sometimes serious. Resistant varieties are under trial. The effect of rate and date of planting on grain and straw yields was investigated and tabular results are given. Small scale trials gave October 1st plantings yielding 8 pecks per acre as superior, but later field trials did not give consistent results.—G.M.W.

Díaz del Pino, A. Cultivo del trigo en nuestro país. [**Wheat growing in Mexico.**] *Chapingo, Mexico* No. **19.** 9-12. 1947. [Nat. Coll. Agric., Chapingo, Mexico] **1163**

The fourth of a series of articles treats manuring, irrigation, place in the cropping system, cultivation and harvesting. In some parts of Mexico average yields of 1200 kg. per ha. can be obtained without irrigation, in others applications of water ranging from 2 to 9 per growing season may be necessary.—G.M.R.

Florence, Istituto Agronomico per l'Africa Italiana No. 57. Relaz. Monogr. Agrar.-Colon. I frumenti di Rodi. [**The wheats of Rhodes.**] By *R. Ciferri* and *G. R. Giglioli.* 1939. pp. 20. [Received 1949] **1164**

Hays, O. E., Bay, C. E., and Hull, H. H. **Increasing production on an eroded loess-derived soil.** *J. Amer. Soc. Agron.* **40.** 1061-9. 1948. [Univ. of Wisconsin] **1165**

Runoff, erosion and yield of moderately and severely eroded plots were compared. In 1939 the average yield of barley on moderately eroded plots was 19.3 bu. per acre as compared with 3.9 bu. per acre on severely eroded plots. In 1940 a 5-year rotation of maize, spring cereal and 3 years of lucerne/brome hay was laid down. Eight tons of barnyard manure were applied to the maize and the rotation received liberal inorganic manuring. Yields of maize in 1939 and 1940 on moderately and severely eroded plots differed considerably, but the yield difference under treatment had disappeared by 1946 and 1947 when the yield was about 80 bu. per acre. The organic matter of the severely eroded soil increased from 0.17 per cent in 1939 to 1.0 per cent in 1945, whilst that of the moderately eroded soil was unchanged. Yields of barley and oats in the rotation remained consistently less on the severely eroded soil from 1939 to 47. Yields of hay were comparable, 3.37 and 3.47 tons per acre respectively on severely and moderately eroded plots.

Average soil losses under maize were 7.71 tons per acre in moderate erosion, 8.76 tons per acre under severe erosion ; respective soil losses under cereals were 11.39 and 19.15 tons per acre and under hay 0.08 and 0.23 tons per acre. Runoff was about double on the severely eroded plots.

Nitrogen content of grain was slightly higher on the moderately eroded soil.

The data show that the loss of 3 or 4 inches of surface soil (Fayette silt loam) does not permanently impair the productivity.—K.J.S.

Sirri, A. Le consociazioni temporanee verso possibilità di maggiori applicazioni. [**Wider application of temporary intercropping.**] *Ital. agric.* **86.** 339-48. 1949. **1166**

During wartime the author studied the cultural possibilities of sweet sorghum and found it convenient to grow it temporarily intercropped with early-harvested wheat. Other types of intercropping, in which wheat is generally the host plant, and maize, sunflower, *Ricinus*, soybean, vetch, etc., the guest plants, have been studied. This article reports agronomic considerations on these trials, while practical results will be given later. The author has invented a machine which sows sorghum among the high rows of wheat. He is of the opinion that this type of farming can have useful applications, provided the plants are rightly chosen and an appropriate technique is followed.—E.B.

Misra, R. K. **Sub-soil irrigation in relation to plant growth. Part I.** *Cent. Bd Irrig. J.* **5.** 389-94. 1948. [Met. Office, Poona]

Misra, R. K., and Subramanian, V. K. **Sub-soil irrigation in relation to plant growth. Part II.** *Cent. Bd Irrig. J.* **5.** 395-7. 1948. [Met. Office, Poona] **1167**

Much of the evaporation and root development work related in these articles has already been described by Ramdas in an earlier number of the same volume. The effect of varying the distance between the soil surface and the water-table on the development and yield of jowar (*Sorghum* sp.) was found, using the variety Aispuri. The developmental features studied were height and area of the fully open green leaves of the plants, and the grain yield was determined in two experiments.

Under shade conditions of cultivation the jowar plants showed no variation in their shoots in spite of changing distances between soil surface and water-table, but the root system increased in length as the water-table was lowered.

In Part II the results of similar experiments conducted in the open are described. The same variety of jowar was grown as well as wheat (variety Jay) and oats. Water requirements of the plant were studied at the different levels. Crop growth was again little influenced in the case of jowar, but both wheat and oats yielded better as the water-table was lowered and their water requirements were considerably reduced at the same time. Further experiments are to be conducted with a variety of crop plants.—M.E.E.

Hubbard, V. C., and Harper, H. J. **Effect of clipping small grains on composition and yield of forage and grain.** *Agron. J.* **41.** 85-92. 1949. **1168**

In the wheat growing areas of the Southwest, autumn-sown cereals are normally pastured in the autumn, winter and spring, the fee for such grazing privileges varying from $1 to $3 per month for mature cows. This experiment was conducted to ascertain how late in the spring cereals can be grazed economically, and the effect on forage production, chemical composition of the forage, and subsequent yields of small grains of different clipping treatments. Twenty-four varieties of rye, barley, wheat and oats, autumn and spring sown, were moderately and severely clipped at intervals during the autumn, winter and spring. Severe clipping was found to produce slightly less forage and much less grain than moderate clipping, while the latter if discontinued before damage was likely to be done to the developing spike, produced as high or higher grain yields than the nonclipped controls. Rye and most wheat varieties withstood clipping better than did winter oats and barley, but all cereals were more deleteriously affected by severe clipping in unfavourable than in favourable growing seasons. Drought and cold weather were found to lower the nitrogen and phosphorus contents of the clippings. The calcium contents of the clippings were not affected by variations in the moisture content of this soil. There was no difference in chemical composition of the clippings from severely clipped and from moderately clipped plots.—T.D.H.

Browning, G. M., and Norton, R. A. **Tillage, structure and irrigation : Tillage practices with corn and soybeans in Iowa.** *Proc. Soil Sci. Soc. Amer.* **12.** 491-6. 1947. **1169**

See *Soils and Fertilizers.*

Crocioni, A. La cimatura e la sfogliatura del granoturco in seconda coltura. [**Topping and stripping of maize in second cultivation.**] *Ann. Sper. agrar.* **3.** 229-36. [English summary, p. 236] 1949. **1170**

A first series of trials (see *Fld Crop Abstr.* **1.** Abs. 1248) was carried out with spring/summer maize, ripening in September. This article refers to trials with three maize varieties (of different vegetative period) which, sown in summer, ripen in October. Topping and stripping have seriously reduced grain production. This decrease is attributed partly to the fact that the plants were treated in an early stage of grain development and, principally, to the abundance of water from rainfall and irrigation. Besides a reduction in seed weight, this treatment determines an earlier ripening which, however, does not seem to justify the use, as a second cultivation, of maize varieties of a longer vegetative period than those usually employed.—E.B.

Arkansas Agricultural Experiment Station. Bull. 479. **Increasing yields of oats in Arkansas.** By *R. P. Bartholomew.* 1948. pp. 19. **1711**

Experiments to determine the effect of seed-bed preparation, rates of seeding and fertilization on winter oats are described and results given. 1. Largest yields resulted when the soil was ploughed 6 inches deep, disked, harrowed and the roots drilled. Preparing dry soil and planting in the dust in order to get the oats planted in time resulted in good yields. 2. Application of phosphate in a rotation of oats, wheat, clover and corn maintained or increased oat yields. 3. Top-dressing with 20 lb. per acre of ammonium nitrate, nitrate of soda and ammonium sulphate resulted in equivalent increased yields, the three therefore being considered of equal value in top dressing oats. Fertilization with superphosphate and ammonium nitrate top dressing gave larger yield increases. When top dressing with nitrogen a period of 6 to 7 weeks was found would give good results. 4. Seeding rates of 12 and 16 pecks per acre produced slightly larger yields than did rates of 6, 8 and 10 pecks, which produced similar yields.—G.M.W.

DONÀ dalle ROSE, A. Risicoltura in terra anomala. Fattori che influenzano la densità dell' attecchimento. [**Rice cultivation on varied soils. Factors affecting the density of growth.**] *G. Agric. Domen.* **59.** 155. 1949. **1172**

Rice cultivation in Italy proves it is suited to different soil types. Often it is the first crop to be grown on land under agricultural reclamation. Peaty soils after rice cultivation are no longer pulverulent, and the following dry crops root better. In particular, in the peats of the Ferrara district the excess of organic matter and acidity of the soil decreases, and better conditions are thus provided for wheat, which follows. Rice has the same function in land reclamation in the district of Rome, on clayish, alkaline and salty soils. For contingent reasons sowing is broadcast on the flooded soil, but under these conditions it is difficult to have a good rooting. It is a known fact that the shooting of the first rice root takes place before or after that of the first leaves depending on the oxygen content of the environment. In the flooded rice field the available oxygen is often insufficient and the leaves shoot before the roots. In this case adequate measures in order to supply oxygen are indispensable. On salty, alkaline soils this can be achieved by an early treatment with calcium sulphate.—E.B.

MIRCHANDANI, R. T. **Role of cultural improvements in the increased production of paddy in Sind.** *Indian Fmg* **8.** 386-90. 1947 [Received 1949] [Agric. Res. Sta., Dokri, Sind] **1173**

The upper Sind rice tract comprising both barrage and non-barrage areas is the hottest zone in India with a maximum temperature of 127°F. The land is alluvial and well drained and conditions are ideal for the cultivation of *Oryza sativa* which gives very high yields by the transplantation method. In lower Sind the varieties are much coarser, are usually broadcast, and produce lower yields. Methods for increasing production under these different conditions are explained in detail. In some cases a crop of *Lathyrus sativus* is broadcast with the last irrigation for rice, to provide a second crop. Seedlings of rice are usually raised by the dry method. Much work has been done to convince farmers that early transplanting of the seedlings will produce good crops. During experiments highest yields were obtained by transplanting during the optimum period from 20th June to 10th July when the average yield was 1744 lb. per acre. Improved systems of planting are recommended and the importance of manuring with sulphate of ammonia is demonstrated by the 30 and 44 per cent yield increases of two varieties. Finally the cultivation of *dubari* or second crops is described. These second crops are usually *L. sativus* or *Cicer arietinum* grown for seed or for fodder, but on alkaline lands *Eruca sativa* is the only successful second crop.—M.E.E.

BRETON, E. Les irrigations dans l'établissement français de Pondichéry. [**Irrigations in the French settlement of Pondicherry.**] *Agron. trop.* **4.** 50-69. 1949. **1174**

Climate and hydraulic regime of Pondicherry are similar to those of the Madras region. A technical account of the system which supplies water to rice fields is given. Water requirements of rice varieties of different vegetative period (from 3.5 to 7 months) are tabulated.—E.B.

NEBRASKA Agricultural Experiment Station. Bull. No. 389. **Growing the winter wheat crop.** By *T. A. Kiesselbach* and *W. E. Lyness.* 1948. pp. 32. **1175**

The requirements of winter sown wheat in Nebraska have been studied over periods of many years. The varieties Pawnee, Cheyenne and Nebred are recommended. The inclusion of a legume in the rotation and the early cultivation of the seed-beds give significant increases in yield, whereas the depth of ploughing is found to have little effect. Control of Hessian fly is obtained by destruction of volunteer plants and by delaying sowing until after the "fly-safe date" which is announced annually by the Dept. of Entomology. Delay beyond this date reduces establishment and winter survival. Resistance to Hessian fly has now been bred and the variety Bawnee gives its maximum yield if planted before the "fly-safe date."

Vernalization treatment of winter wheat for spring sowing has failed to give yields comparable with spring varieties. A large grade of seed prepared with a fanning mill gave no advantage save its freedom from weed seeds.

Resistance to stinking smut can be obtained but it is not a character of primary importance owing to the ease of control by seed treatment with Ceresan or copper carbonate.

In Eastern Nebraska at least, surface drilling at 7 inch spacing gives greater yields than the customary furrow drilling at 14 inches. Pasturing of the winter wheat crops always reduces yield, except when total loss would have been experienced due to lodging. Premature harvesting at the dough stage also causes a loss of yield. Very little effect on yield and none on baking quality is obtained by delaying harvest one or two weeks beyond maturity as necessitated by the use of combine harvesters—R.N.H.W.

UNITED STATES, Department of Agriculture. Leafl. No. 247. **Soil moisture and wheat yields on the high plains.** By *H. H. Finnell.* 1948. pp. 8. **1176**

Methods of conservation of soil water in the wheat growing areas of the United States are discussed. The annual rainfall of 17 to 25 inches is adequate to produce good crop yields if skilfully conserved. Wheat yields are dependent on the depth of soil moisture at the time of sowing, especially during a dry season. The importance of retaining moisture immediately after harvest by contour cultivation, covering bare soil with trash, and the early destruction of weeds is stressed. These methods also help to prevent soil erosion by wind.—R.N.H.W.

SHIER, F. L., and CULLINANE, W. P. **The influence of rotation on the yield and flour strength of wheat.** *J. Dep. Agric. W. Aust.* **25.** 351-61. 1948. **1177**

The rotation experiments conducted at the Chapman and Wongan Hills Research Stations over a 4-year period employed *Lupinus varius* as the renovating legume for rotation with the wheat crop. At each station rotations comprised (a) continuous wheat ; (b) fallow, wheat ; (c) stubble, fallow, wheat ; (d) lupins, lupins, fallow, wheat. Whilst rotations (b) and (c) gave better yields of wheat than (a), the inclusion of 2 years of legume in rotation (d) frequently resulted in two or three-fold increases over the yields from continuous cropping. Farinogram diagrams also show that flour strength of the wheat grain was definitely improved through rotation with the legume.

These results show that recent decreasing wheat yields on some soils can be avoided by introducing more nitrogen into the soil by legume rotations.—M.E.E.

OLIVA, A. La coltura del grano in rapporto alla sistemazione del suolo. [**Wheat cultivation in relation to soil regulation.**] *Ann. Ente consorz. interprov. toscano Sementi* **2.** 151-64. 1940. [Received 1949] **1178**

PAVARI, A., and GASPARINI, M. L'azione di difesa dei frangiventi sulla coltura granaria. [**Protective action of wind-breaks on wheat cultivation.**] *Ann. Ente consorz. interprov. toscano Sementi* **3.** 173-206. 1944. [Received 1949] **1179**

MUKHERJEE, R., and PARTHASARATHY, D. **The digestible nutrients of certain cereal grains as determined by experiments on Indian fowls.** *Ind. J. vet. Sci.* **18.** 41-5. 1948. [Indian Vet. Res. Inst., Izatnagar] **1180**

Digestion experiments were conducted with the cereal grains of *Sorghum vulgare*, *Eleusine coracana*, *Pennisetum typhoideum*, and *Hordeum vulgare.* The starch equivalent and digestible protein data are recorded. Barley was the richest of all in protein content while the three millets *S. vulgare*, *E. coracana* and *P. typhoideum* were almost equal in value.—M.E.E.

DAS GUPTA, N. C. **Some cereal grains as cattle feed.** *Indian Fmg* **8.** 342-3. 1947. [Received 1949] [Cattle Feeding Res. Scheme, Bharari, U.P.] **1181**

Although coarse straws are used throughout India for feeding cattle, little or no information is available to indicate what nutritive value they possess or what supplemental quantities of energy-rich food are necessary for optimum production. The present experiments conducted with young bulls at the research station are undertaken to study the value of *Hordeum vulgare*, *Pennisetum typhoideum*, *Sorghum* sp., and *Zea mays* grains for feeding cattle. Average gains in live weight were measured and assimilation of calcium and phosphate is given for each cereal. Barley showed slight superiority as a feed, but the results indicate that *P. typhoideum* can be successfully fed to growing cattle whenever practicable.

The same article is printed again in the October issue of the same volume of this journal. —M.E.E.

HUNTER, H. **Kenia and allied varieties of malting barley.** *Farming* **3.** 86-8. 1949. **1182**

The new barley varieties Kenia and Maja possess finer, short, upstanding straw and are relatively earlier in ripening when compared with the established varieties, Spratt-Archer and Plumage-Archer. Though the yield is about equal in both types, analyses and malting trials made by the Institute of Brewing on Kenia and Spratt-Archer showed Kenia gave an average total N content 0.12 per cent in excess of, and 3.6 grm. per 1000 grains less than Spratt-Archer, while the hand valuation of Kenia was also inferior. When Kenia barley is undersown with grasses and clovers, the advantages of the short straw for combining is offset in a wet season by rendering the harvesting difficult. Varieties of the Kenia series exhibit a greater susceptibility to smut than Spratt- and Plumage-Archer.—K.O.

ПЕЧЕРСКАЯ, С. Л. Голозерный ячмень. *Селек. Семеновод.* 1949. *No.* 4. стр. 53-4.

PEČERSKAJA, S. L. [**Naked barley.**] *Selek. Semenovod.* 1949. No. 4. 53-4. **1183**

Naked barley can play an important part in the USSR particularly in the northern regions of the non-black earth zone of the European part of the Union and the high mountain tracts of Siberia, the Caucasus and Central Asia, where millet frequently does not ripen and buckwheat gives varying yields in different years.

At the Šatilov State Plant Breeding Station in 1944 two interesting varieties of naked barley—Slava and Jantarj—were bred. The large-grained variety Slava is higher yielding than the variety Europeum 353/133 produced in the Orlov province.

At the Falenck State Plant Breeding Station, a new variety of naked barley—Uspeh—has been bred. This variety is large-grained with absolute weight of grain 55.4 grm., early ripening (ripens 5 to 6 days earlier than the variety Viner) with high protein content (17.8 per cent). Its yielding capacity is slightly lower than that of Viner.

Naked barley as a rule ripens faster than glumed barley, which is of special importance for northern and mountainous regions. Although relatively lower yielding, it gives a large amount of groats and meal of better quality than in the glumed varieties.—R.P.J.

JOHNSTON, W. H., WELLS, S. A., and KUSCH, A. G. **Reaction of barley varieties to spring frost.** *Sci. Agric.* **29.** 60-8. 1949. [Dom. Exp. Fm Serv., Ottawa] **1184**

A report is given on the reaction of barley varieties in tests at the Dominion Experimental Stations, Swift Current, Sask., and Scott, Sask., and at the Dominion Experimental Farm, Brandon, Man., to a severe and widespread frost occurring on the night of May 27, 1947.

Significant variety differences were obtained in the case of all tests. The behaviour of the varieties in the different tests was generally consistent. Among the more resistant named varieties were: Compana, Bay, Vance Smyrna, Munsing, Tregal, OAC. 21 and Titan. Relatively high susceptibility was shown by: Velvon, Montcalm, Flynn, Frontier, Newal and Gem.

The hybrid selections represented in the tests howed a wide range of reaction—from extreme usceptibility to a resistance about equal to that of OAC 21.—Authors' summary.

TIDSKRIFT FÖR LANTMÄN. Erfarenheter av nagra nyare spannmålssorten. [**Experiences of some new cereal varieties (in Finland)**]. *Tidskr. Lantm.* **31.** 118-20. 1949. **1185**

J. Stenström reports that Pekka rye is very suitable for the Fiskars area. Previously Toivo and Sagniz rye were cultivated, but as Pekka is at least as high yielding as Sagniz and in addition is more winterhardy and has shorter and stiffer straw, the older varieties are no longer grown. Yields of up to 3000 kg. per ha are not unusual. In very exposed situations Pekka should be replaced by the new Jockis variety Onni (1945).

Of autumn wheat varieties Varma (1933 from Tammisto) has proved to be best. Olympia wheat (1942 from Jockis) is not suitable for the good autumn wheat soils of south Finland. The straw is too long and weak.

Of the new spring wheat varieties Weibulls Brons (1945) and Kärn II are high yielding, possess good qualities and stiff straw. At Fiskars both varieties have been included in experiments during three years. Brons does not appear suitable: in colder situations it ripens much later than Diamant II. Kärn II on the contrary in varietal trials has given the highest yields and is decidedly superior to Diamant II as regards stiffness of straw. Time of ripening is 2 to 3 days later. Kimmo spring wheat released from Tammisto in 1941 has very stiff straw and very good baking qualities. Its yield is slightly less than that of Diamant wheat, but it ripens a day or two earlier.

The new barley varieties Balder (1942 from Weibull) and Maja (1933 from Denmark) are each decidedly superior to Binder barley (1913 from Denmark) commonly grown in Finland. In south Finland Balder is superior to Maja: it possesses better malting properties than the latter, and in addition it has stiff straw and a very high yield of grain.

Tammi barley, 6-rowed fodder barley, is the best early variety for soils which are not too dry. The yield is high, and the variety is 3 weeks earlier than Balder. It is well suited for the half-fallow and as a cereal nurse crop.

New oat varieties of interest are the indigenous Tammisto bred varieties Eho (1946) and Sisu (1948) together with Sol II from Svalöf. Eho is white-husked and ripens 2 days earlier than Guldregn II. The grain yield is almost equal to that of Guldregn II but the husk is thinner and the straw slightly stiffer.

Sisu gives a decidedly higher yield than Guldregn II and has a 1 to 2 days longer growing period than the latter. It has stiffer straw than Guldregn II and Eho and has thinner husk but the grain is very uneven. Sisu belongs to the white oat varieties, but both black and yellow-chaffed grains are met with.

Sol II has been grown at Fiskars for less than 2 years. It is about equal to Sisu in grain yield and the grain is fine and uniform. The percentage of husk is higher than in Sisu but better than in Guldregn II and stiffness of straw is considerably better than in the two above-mentioned varieties. The growing period of Sol II is 2 days longer than that of Guldregn II. At Fiskars at present Sol II is preferred to Sisu.

Eho is more suitable for central Finland.

J. Sinisalo of the Institute of Plant Breeding at Jockis states that Kärn II spring wheat on the basis of experimental results obtained hitherto is especially high yielding and also for the rest a valuable bred variety but its importance for Finland is limited owing to its being late.

The results of experiments indicate that Brons spring wheat has a larger yield than Diamant, but a smaller yield than Kärn II. Stiffness of straw in Brons is better than in Kärn II, but as Brons is neither earlier nor in other respects better, owing to its lower yield it cannot compete with Kärn II.

Balder barley is distinctly superior to Binder in yield and stiffness of straw. The kernel is slightly smaller but hl. weight is equal to that of Binder. Balder has good malting properties. On soils in poor heart Balder may have such short straw that the work of harvesting is rendered difficult. If a combine is used, the short straw is not detrimental.

On the basis of a large number of experiments Sisu oats can be stated to give a more abundant yield and to possess better stiffness of straw than Guldregn II. Both belong to the same class of earliness, although Sisu is slightly earlier. Sisu's grain is of normal size and particularly thin-husked (the husk content is considerably less than in Guldregn II) but it is narrow and drawn out to a point. It is more suitable as a fodder oat, and is then of the highest class.

Sol II gives a more abundant yield than Guldregn II but is not so high-yielding as Sisu. In many trials it has been superior in stiffness of straw even to Sisu. The quality of the grain is excellent. The grain is white-husked, large and hl. weight is high. Of the three varieties mentioned, Sol II should be placed first.—R.P.J.

CENCHEL, M. Några resultat av sortförsöken vid Statens försöksgård Offer 1931-1947.] [**Some results of variety trials at Offer State Experiment Station 1931-1947.**] *Västernorrlands Lantmannatid* No. 2-3. 1949. pp. 8. **1186**

Results of variety trials with barley, oats, and autumn-sown rye are reported.—R.P.J.

ÅKERMAN, Å. Bedömning av stråsädessorters odlingsvärde. [**Estimation of the value of cereal varieties.**] *Nord. JordbrForskn.* 1948. No. 7-8. 173-8. **1187**

A paper read at the meeting of the Crop Cultivation Section of the Association of Scandinavian Agricultural Investigators on 17 March, 1948.—R.P.J.

MILLER, W. B. **Recommended cereal varieties.** *J. Dep. Agric. Vict.* **47.** 62-6. 1949. **1188**

Recommendations which have been endorsed by the Victorian Wheat Advisory Committee are presented. Varieties are classified into (A) grain wheats, (B) hay wheats, (C) oats, and (D) barley. Consideration has been given to the various environmental conditions in the different districts and the results of experimental work at the Research Stations and on farmers' plots.—P.M.

FENAROLI, F. Le prime sementi di mais ibrido prodotte in Italia. [**The first seeds of hybrid maize produced in Italy.**] *G. Agric. Domen.* **59.** 157. 1949. **1189**

The author refers to the programme of seed production of hybrid maize in Italy which in a few years should be in a condition to meet internal and eventually foreign demand. The two hybrids described in this article are "Insubria 1 and 2" which reproduce the American "US 13" and "Ohio C 92."—E.B.

GIORNALE di AGRICOLTURA della DOMENICA. Un nuovo grano. Il O.10. [**A new wheat variety. O.10.**] *G. Agric. Domen.* **49.** 153-4. 1949. **1190**

The "Produttori sementi" of Bologna state that the variety "O.10" has successfully been tested in field trials. Its characteristics are: autumn, soft, early; average height 80 to 85 cm.; thickly bunching; resistant to cold and particularly to lodging. The cold resistance partly consists in the fact that the "O.10" is slow in rising and late in flowering, thus it avoids late frosts, while the ripening phase is short. The yield is superior to that of all other varieties (52.3 q. per ha.). It is thought that it will be widely grown in the Po plain replacing other varieties which have become "old".—E.B.

GASPARINI, M. Il miglioramento della maiscoltura nell'Italia Centrale. La selezione di un granturco precoce toscano. [**Improvement of maize cultivation in Central Italy. Selection of an early Tuscan maize.**] *Ann. Ente consorz. interprov. toscano Sementi* **3.** 27-42. 1944. [Received 1949] **1191**

NORTHERN IRELAND, Monthly Report of the Ministry of Agriculture. **Oats—a vital crop.** *Mon. Rep. Minist. Agric. N. Ire.* **23.** 267-72. 1949. **1192**

The report, of special interest to Northern Ireland farmers, describes the place of oats in the rotation, details of manuring, preparation of soil and sowing, importance of clean seed, seed rate and disinfection. Varieties suitable are; for good soils:

Victory, Crown, Stormont Arrow, Stormont Iris, Onward and Elder ; for medium soils : Stormont Grandee, McGill-Smith Pure Line Potato, Castleton Potato, R.30 and Utility ; for poor soils ; Stormont Kern, Gordon Sandy, and Tyrone Tawny.—K.O.

I'So, S. Adatok a zab minoségi értékeléséhez. [**Contribution to the estimation of quality of oats.**] Mosonmagyaróvár, 1941. pp. 35. [English summary appended in typescript, pp. 2.] **1193**

This is part of a larger study as yet unpublished. Results indicate that quality of oats can best be expressed in terms of ratio of grain to hull (hull content) and this is also an accurate quantitative measure of the calorie value. There is no definite correlation between results of physical estimations and content of fibre. In considering hull content, it is important also to consider empty kernels. The ratio of grain to hull is lower in winter oats than in spring oats. The hull content is more influenced by the environment than by the properties of the variety. Hull content is thus not constant, but shows relative differences between varieties with different drought resistance according to the dryness of the year.—From English summary.

United States, Department of Agriculture. Circ. 795. **New varieties of oats from Bond crosses resistant to Victoria blight.** By *T. R. Stanton.* 1948. pp. 7. **1194**

Considerable losses in oat yields were caused in certain parts of the U.S.A. during 1946 and 1947 by a disease which has been named " Victoria blight ", caused by *Helminthosporium victoriae.* This disease attacked only the recently evolved varieties derived from the variety Victoria, such as Boone, Cedar, Tamar and Viclana. Valuable new spring oats resistant to Victoria blight, all races of crown rust except numbers 45 and 57, common races of stem rust and many northern races of oat smut have been evolved from crosses involving Bond. These varieties, which have stronger straw and higher yield than any other varieties available in the U.S.A. are Clinton, Benton, Cherokee, Bonham, Advance, Shelby, Eaton, Mohawk, Bonda, Mindo, Andrew, Zephyr, and Nemaha. In addition, two new winter varieties, Camellia and Florida 167, suitable for the cotton belt of the U.S.A. but susceptible to stem rust and to leaf and glume blotch have been obtained from Bond crosses. Seed of many of these varieties is already available ; the remaining varieties are being multiplied as rapidly as possible.—F.G.H.L.

КРАСНООК, Н. П. и ЯРКИН, С. А. **Селекция риса на Всесоюзной Рисовой Опытной Станции.** *Селек. Семеновод.* 1949. *No.* 4. стр. 35-8.

Krasnook, N. P. and Jarkin, S. A. [**Breeding of rice at the All-Union Rice Experiment Station.**] *Selek. Semenovod.* 1949. No. 4. 35-8. **1195**

See *Plant Breeding Abstracts.*

Portères, R. Le riz vivace de l'Afrique (*Oryza Barthii* A. Chev.) [**Perennial rice of Africa (Oryza barthii A. Chev.)**] *Agron. trop.* **4.** 5-24. 1949. **1196**

A few species of wild rice are reproduced by seed and also by rhizomes : they are *O. latifolia, O. perennis, O. barthii* and *O. madagascariensis.* An introductory chapter deals with the world distribution of these species. In Africa only *O. barthii* is present. Nomenclature, vernacular names, description, varieties, geographical diffusion and information on its biology are given. Multiplication is described with the help of plates. The grain is used for human consumption (chemical analysis is reported). The plant is also used for green and dry fodder, for artificial fertilizers and for paper making.—E.B.

China Agricultural Research Institute, Taiwan Bull. 5. **Preliminary report on the blast resistant rice variety " Kwangfu No. 1 ".** By *Shou Jen Yang.* 1947. pp. 12. (English summary p. 8.) **1197**

Gasparini, M. La segale " Cinquecento " [**Rye " 500 ".**] *Ann. Ente consorz. interprov. toscano Sementi* **2.** 137-44. 1940. [Received 1949] **1198**

Fajersson, F. Weibulls Original Arosvete. [**Weibull's original Aros wheat.**] *Agri. Hort. Genet.* **6.** 146-55. [English and German summaries, 154-5.] 1948. **1199**

Weibull's Original Aros wheat, which was placed on the market in 1947, was produced from the cross Äring × Ergo.

The variety has proved slightly more winter-hardy than Ergo wheat and is superior to that variety in grain yield in the eastern parts of Central Sweden. Thus it surpassed Ergo by 4.1 per cent on the average of 154 trials in the provinces of Östergötland, Södermanland, Stockholm, Uppsala and Gävleborg.

Aros is equal to Ergo in straw strength, but the straw is slightly shorter than in the latter variety. It ripens at the same time as Ergo, but earing takes place 1 to 2 days later. The later earing is probably the reason why Aros is less heavily attacked by the gall midge (*Puccinia triticina*) than all the other wheat varieties in the same earliness group. Aros shows good resistance to *Puccinia triticina* and *Erysiphe graminis.*

In quality Aros is at least equal to Ergo. Hectolitre weight of both varieties is the same and 1000-grain weight is almost equal. Both varieties have broadly speaking the same protein and gluten content. The baking capacity of Aros is slightly better than that of Ergo.

A small number of ears of Ergo-like type occur in Aros. The highest permitted content of these is 0.20 per cent.—R.P.J.

ЛЬВОВА, И. Н. Причины стерильности межвидовых гибридов пшеницы. *Селек. Семеновод.* 1949. *No.* 4. стр. 20-5.

Ljvova, I. N. [**Causes of sterility of inter-species hybrids of wheat.**] *Selek. Semenovod.* 1949. No. 4. 20-5. **1200**

See *Plant Breeding Abstracts.*

Haan, H. de De historische ontwikkeling van de Amerikaanse baktarwerassen. **History of the American bread wheat varieties.** *Landbouwk. Tijdschr.* **61.** 215-20. [English summary, p. 220.] 1949. [Plant Breed. Inst. Wageningen, Netherlands] **1201**

An account is given of the adoption and use of spring wheat varieties in Canada and the United States, from the Red Fife of the last century to Marquis in 1909 and Thatcher in 1934-44, and of the winter wheats Tenmarq, Turkey and Blackhull grown in the United States, where wheat growing is based for 47 per cent on hard winter wheat. Information is also given on new, disease-resistant varieties.—From author's summary.

Haan, H. de De in Argentinië genomen maatregelen om de bakwaarde der tarwe op een hoger peil te brengen. **Measures taken in Argentina to improve the baking quality of wheat.** *Landbouwk. Tijdschr.* **61.** 221-6. [English summary, pp. 225-6.] 1949. [Plant Breed. Inst., Wageningen, Netherlands] **1202**

An account of wheat breeding in Argentina since 1912 and of the principal varieties now used. Of the wheat grown in the Republic, 70 per cent is of the semi-hard, 20 per cent of the hard type.—From author's summary.

Pantanelli, E. Le prove di orientamento delle razze tenere precoci di frumento nel mezzogiorno continentale (Puglia e Lucania). [**Indicative trials on soft early wheat varieties in south Italy (Puglia and Lucania)**] 1941. pp. 15. [Received 1949] **1203**

Modigliani Rossi, Alessandra. Contributo al riconoscimento di alcune razze e varietà di frumenti da montagna mediante il saggio all'acido fenico. [**Contribution to the identification of some races and varieties of mountain wheat by the benzoic acid test.**] *Ann. Ente consorz. interprov. toscano Sementi* **3.** 105-11. 1944. [Received 1949] **1204**

Grifoni, E. Un caso di inquinazione del frumento "Cappelli." [**A case of impurity in "Cappelli" wheat.**] *Ann. Sper. agrar.* **3.** 21-4. [English summary, p. 24] 1949. **1205**

Besides the presence in the hard wheat "Cappelli" of a variable proportion of yellow berries [*Fld Crop Abstr.* 2. Abs. 842] the author has found that in Southern Italy the "Cappelli" is mixed to a form of soft wheat which cannot be eliminated by field selection. This form has well defined characters which are hereditary. The possibility of a mutation, as well as other suppositions are advanced. Researches are continued in order to explain the phenomenon.—E.B.

Catania, Stazione Sperimentale di Granicoltura per la Sicilia. Publ. No. 9. I frumenti siciliani. [**The Sicilian wheats.**] By *U. De Cillis.* 1942. pp. 323. [Received 1948] **1206**

Todaro, F. Vecchie razze elette. I grani "48" e "96." [**Old elect varieties. Wheats "48" and "96".**] *Ital. agric.* **86.** 263-4. 1949. **1207**

The characteristics of these varieties, of a medium vegetative period, are reviewed.—E.B.

Agricultural Gazette of New South Wales. **Varieties of wheat recommended for 1949 sowing.** *Agric. Gaz. N.S.W.* **60.** 3-4. 1949. **1208**

Cook, L. J. **Results of replicated trials with wheat varieties 1948-49.** *J. Dep. Agric. S. Aust.* **52.** 407-10. 1949. **1209**

" Seven replicated and randomized trials with wheat varieties were carried out by the Department of Agriculture during 1948-49 season at centres in the principal wheat growing districts of the State. The trials included several new varieties not previously tested by the Department. The table accompanying this report shows the average yield per acre together with percentage yield compared with Bencubbin (representative of 100 per cent) at each centre."—Extract.

Fraser, J. G. C. **The varietal composition of Canadian export wheat, 1926-1946. A study based on twenty annual analyses of export cargoes.** *Sci. Agric.* **29.** 97-127. 1949. [Cereal Div. Cent. Exp. Fm., Ottawa.] **1210**

In 1925 fear was entertained by certain persons that the reputation of Canadian export wheat was in danger because of the high percentage of varieties of mediocre quality which it was believed were being grown at that time. In order to obtain factual information on this point, the Cereal Division, Department of Agriculture, Ottawa, in co-operation with the Board of Grain Commissioners, conducted exacting investigations extending over a 23-year period. During this period actual growing tests were made at Ottawa of 2875 samples collected by the Board of Grain Comissioners from this number of cargoes actually shipped from Pacific and Eastern Ports.

The data presented indicate clearly that at no time during the period under investigation was the percentage of undesirable varieties sufficiently great to have any possible effect on the general quality of our wheat.

While it is true that the number of undesirable varieties grown at one time was possibly greater than one would wish, yet the actual percentage of these was never very high. To-day, most of these varieties are practically extinct.—Author's summary.

UNITED STATES, Department of Agriculture. **Research programme for the improvement of hard red winter wheat. Report of the committee appointed by the Directors of the Agric. Exp. Stations of Colorado, Kansas, Minnesota, Montana, Nebraska, Oklahoma, S. Dakota, Texas and Wyoming in co-operation with U. S. Dept. Agric.** 1947. pp. 32. **1211**

Hard red winter wheat comprises about 44 per cent of the total wheat crop of the U.S.A. and is valued at $420,000,000 a year. An expansion of the present research programme on this crop is outlined.

Until recent years the variety Turkey and selections from it had provided 99 per cent of the hard red winter wheat crop but since the introduction of the present research programme this variety has been largely replaced by others of which Tenmarq is the most important. These new varieties give higher and more consistent yields, largely owing to their better disease resistance, greater winter hardiness and stronger straw. The expansion in the research programme is planned to include investigations of disease resistance, in particular of resistance to leaf and stem rust and of resistance to attack from hessian fly, greenbug, wheat straw worm and other insect pests. It is planned to carry out physiological investigations into the mechanism of resistance to drought and high temperatures and of winter hardiness, with particular reference to the damage caused by low temperatures in the autumn and spring. The proposed programme is also designed to include research into the physical and chemical properties of wheat flour and dough necessary for the proper evaluation of varieties. The present research programme cost one-twentieth of one per cent of the annual value of the crop. The expansion would increase this to one-eighth of one per cent. The increased cost should be amply justified in the increased yields obtained.—F.G.H.L.

IVERSEN, K., and DORPH-PETERSEN, K. Forsøg med forskellige Udførselstider for Kalkkvaelstof. 1944-1947. [**Trials with different times of application of calcium cyanamide 1944-1947.**] *Tidsskr. Planteavl.* **52.** 520-38. 1949. **1212**

The crops included in the trials were winter cereals, spring cereals and roots. The trials indicate that in the case of all the crops calcium cyanamide has been most effective when applied in the spring—and with root crops when it has been harrowed in immediately following application. Where it is possible to buy other nitrogenous fertilizers there is no reason for using calcium cyanamide as nitrogenous manure—unless the nitrogen in this case can be bought at a price 40 to 50 per cent below the price in the commonly used nitrogenous fertilizers, or where calcium cyanamide can at the same time operate as a weed-killer.—R.P.J.

BERG, M., and OTTOSSON, L. Skördetröskning vid låg vattenhalt. Undersökning över spannmålens vattenhaltsförändringar skördeperioden 1948. [**Combining grain at a low moisture content.**] **An investigation of the moisture content of grain during the harvesting season 1948.**] *Jordbruks. Inst. Medd.* Nr. 223. pp. 57. [English summary, pp. 54-6] 1949. **1213**

The investigation was carried out at Ultuna, Uppsala with oats (Guldregn), winter wheat (Ergo) and barley (Maja). Samples for determination of moisture content were taken every other hour during the day and night, but moisture content of the straw was determined only during the day.

After the grain had reached binder ripeness the moisture content was influenced mainly by changes in the weather and did not drop steadily as ripening advanced.

On the whole, changes in the moisture content were fairly similar for all three types of grain. There were, however, certain differences: oats were most sensitive to changes in the weather, barley rather less so, and winter wheat was least sensitive. This meant that the moisture content of oats rose most during rain, but it also dropped fastest after rain; the moisture content of wheat rose least and dropped most slowly. After a lengthy period of rain, harvesting could be started first in oats, then in barley, and last in winter wheat. After a short period of rain, on the other hand, the moisture content of winter wheat had not time to rise much, while that of oats often rose so much that harvesting had to be discontinued for some hours; barley occupied an intermediate position in this respect. The moisture content of straw varied in a similar manner, although the variation was much greater and took place much more quickly. The moisture content of straw was usually higher than that of grain and it was only winter wheat straw which had, on a few occasions, a sufficiently low moisture content to be baled or stacked immediately after combining.

The combine should be used for harvesting only when the moisture content is below 20 per cent. Results of the investigation indicate that the moisture content of the three grain types was below 20 per cent for a total of about 130 hours: the average moisture content during this time was 17 per cent for all three grains. With a 6-foot combine about 80 ha. can be harvested in 130 hours.—R.P.J.

ØVERBY, G. Kvalitetsundersøkelser av skurtresket og direkte tresket korn høsten 1948. [**Investigations of quality of combine-threshed and directly threshed grain in the autumn of 1948** (**in Norway**).] *Norsk Landbr.* **15.** 265-9. 1949. **1214**

Questions investigated included how soon after cutting the grain should be dried; baking quality of combine-threshed and directly threshed grain; power of germination of combine-threshed and directly threshed grain, and storage of straw from combine-threshed and directly threshed crops. —R.P.J.

OXLEY, T. A. **The scientific principles of grain storage.** 23 × 15. pp. 103. Liverpool: The Northern Publishing Co. Ltd., 37 Victoria Street. 1948. 8s. 6d. **1215**

This is stated to be the first book in English on the problems involved in the storage of grain, the only other works known to the author being one in German by Hoffman and Mohs, and one in Italian by Luraschi. The present work differs from the others in dealing more fully with the scientific principles of grain storage rather than with the design of places of storage.

The following gives an indication of the approach adopted in the book: physics of a grain bulk and water relations of cereal grains, ventilation of storage places and forced ventilation of bulk grain, drying of grain for safe storage, spontaneous heating of stored grain, and methods for measuring (a) temperatures in stored grain, (b) carbon dioxide and water vapour in the intergranular atmosphere, and (c) insect infestation by carbon dioxide production. The final chapters discuss the general questions of insect infestations and the more important grain insects and mites.—R. O. Whyte.

FARM IMPLEMENT AND MACHINERY REVIEW. **Grain conveying and bin drying plant.** *Fm Impl. Mach. Rev.* **73.** 877-8. 1948. **1216**

An illustrated account is given of the "Sturtevant" pneumatic system. Grain can be delivered to silos from an inbake hopper, directly or through a drier, and turning, redrying or recleaning can be carried out before sacking-off and despatch.

Grain is fed pneumatically through a piping system and it is possible to arrange the piping to avoid obstacles providing the bends are of large radius to avoid damaging the grain. Extensions of the conveying system to other buildings can readily be carried out.

Delivery to the silos is by lever switches which divert the grain to swivelling outlets, usually arranged to feed four silos. When grain has to be returned to the drying or dressing machinery, or sacked off from the silos, an expansion box is provided into which the grain is delivered, the air passing out through a vent in the top of the box. Grain flows by gravity through a swivelling pipe at the bottom where it can be directed to the appropriate machinery or sacked off.

Warm air can also be passed through the bins by fitting perforated metal pipes in any silo before filling. These pipes are coupled to the grain discharge outlet and warm air from a heater blown through the grain.—P.M.

BLACKWOOD, A. C., WHEAT, J. A., LESLIE, J. D., LEDINGHAM, G. A., and SIMPSON, F. J. **Production and properties of 2, 3-Butanediol. XXXI. Pilot plant studies on the fermentation of wheat by** *Aerobacillus polymyxa. Canad. J. Res.* **27.** Sect. F. 199-210. 1949. **1217**

In this paper are described the construction and operation of a pilot plant in which whole wheat mashes were successfully fermented by *Aerobacillus polymyxa.* A yield of 8.9 lb. of levo-2,3-butanediol and 5.9 lb. of ethanol per bushel of wheat was obtained, which is a fermentation efficiency of 90 per cent. The best fermentations were obtained at 32°C. using a 15 per cent mash buffered with calcium carbonate. Agitation increased the fermentation efficiency at 96 hr., but decreased the diol-to-ethanol ratio. Reduced pressure did not change the efficiency but markedly reduced the ratio of diol to ethanol. Aeration had little effect. The presence of contamination organisms was highly detrimental and it was necessary to sterilize the mash, vessels, and piping. Although a backstocking technique could be practised in the preparation of inoculum, frequent recourse to stock cultures or improved strains was found advisable for maintenance of high yields.—Authors' abstract.

NOTTINGHAM UNIVERSITY, School of Agriculture, Department of Agricultural Economics. **Barley growing in the East Midlands in 1948** (**Interim Report.**) 1949. pp. 4. [Mimeographed.] **1218**

Previous to the period of depressed prices between 1930 and 1939, barley was the main crop on farms in the East Midland province; now, with the increased returns possible, this crop is again becoming increasingly important occupying almost one-fifth of the total acreage of the farms recorded. The most popular variety grown is Spratt Archer, with Abed Kenia and Plumage Archer second and third in order of importance. On both the Lincoln

Wolds and the Lincoln limestone, the most common rotation is still the four-course, or five-course with three corn crops, but, since the decline in sheep farming, sugar beet, and to a lesser extent potatoes, have largely displaced the root crops grown for stock feed. On many farms cross-cropping is practised, and some curious crop sequences have been recorded.

In the analysis of cost per acre, distinction is drawn between crops which were combine harvested, and crops harvested by binder. The striking feature of the results is the low cost at which barley has been grown on the majority of the farms.—A.D.H.

Janko, J. A rizstermesztés költsége. [**The expenses of rice-growing.**] *Agrártudomány.* **1.** 21-5. [English summary p. 25.] 1949. **1219**

The growing of rice began to spread in Hungary during World War II, and has now developed sufficiently to meet the home demand. This production is, however, uneconomic as the cost of the grain is still above world market prices. This is due to cultivation on too small areas, and can be overcome by cultivation on large areas, by association of farmers. In addition to reducing the cost of rice growing, it would be possible to cultivate other irrigated plants on these larger areas, thereby effecting further savings.—From English summary.

ЖИВОВ, В. И. и СОЛОВЬЕВ, Ф. В. Семеноводство в Московской области. *Селек. Семеновод.* 1949. *No.* 1. стр. 13-21.

Živov, V. I. and Solobjev, F. V. [**Seed production in the Moscow Province.**] *Selek. Semenovod.* 1949. No. 1. 13-21. **1220**

At present there are fifty-three regional seed producing farms for grain crops and nine for producing seed of herbage plants, all of which are concerned with multiplying elite strains and with growing seed of a second reproduction for sowing in the Province of Moscow. The farms are also introducing a rotation system for field, vegetable and fodder crop production. From some of the farms data are available which show the yields obtained before and after introduction of the rotation system.—M.H.

Haskell, G. **Cold hardiness and seed shape in maize.** *Nature, Lond.* **163.** 907-8. 1949. [John Innes Hort. Inst., Merton Park, London, S.W.19] **1221**

It has been claimed that " round-grade " dent maize seeds withstand cold weather after early spring sowings better than do " flat-grade " seeds. The author has studied the germination of both types of seed when subjected to 50°F. for 8 days. The germination was similar, and angular germination values were subjected to analysis of variance. —M.H.

Gasparini, M. Prove di refrigerazione del seme di frumento. [**Trials of refrigeration of wheat seed.**] *Ann. Ente consorz. interprov. toscano Sementi* **2.** 191-5. 1940. [Received 1949] **1222**

Ghisleni, P. L. L'azione dei raggi U.V. sul grano. 1. L'azione sulla germinabilità di cariossidi nate da piante trattate con raggi U.V. [**The action of ultra-violet rays on wheat. 1. The action on germinability of seeds from plants treated with ultra-violet rays.**] *Nuovo G. bot. ital.* **55.** 358-74. [English, French and German summaries,] 1948. **1223**

With the purpose of studying the influence of ultra-violet light on plants, the author harvested, 10 days after fertilization, 1040 plants of *Triticum vulgare* Vill., and divided them in many groups. He then divided the ears differently, and screened them partially from light so as to obtain, on the same spike, treated and untreated grains. He exposed the ears, for different lengths of time, to the light of a quarz-lamp, giving predominantly ultra-violet rays. Results, limited for the present to the influence of ultra-violet light upon both germinating energy and power, are the following : (a) ultra-violet light stimulates the germinating power of grains borne from plants treated for periods up to 240 hours, at a distance of 1 metre from the lamp ; with longer exposures the germinating power decreases ; (b) ultra-violet light stimulates the germinating energy of grains borne from plants treated for lengths of time up to 120 hours ; with treatments of 120 to 240 hours there appears to be no relevant modification. With treatments of over 240 hours the germinating energy is considerably reduced ; (c) under the experimental conditions, a 10 days exposure appears to be the most favourable from every aspect ; a 7.5 days exposure is insufficient, and a 12.5 days exposure harmful ; (d) glumes are strong screens against ultra-violet light ; (e) ultra-violet light produces delayed effects.

In consideration of the difficulties encountered in this kind of research, the author gives some suggestions concerning the opportunity of fixing in advance the convenient doses of ultra-violet rays to be given to the plants under study, in order to avoid waste of time and to obtain data of general value.—From author's summary.—E.B.

Kole, A. P. Kleurstoffen of groeistoffen ? Enkele ervaringen met onkruidbestrijdingsmiddelen. [**Di-nitro cresol or plant growth regulators ? Some experience of weedkillers.**] *Maandbl. LandbVoorlDnst.* **6.** 130-4. 1949. [Phytopath. Service, Netherlands.] **1224**

DNOC (di-nitro cresol) and two preparations containing plant growth regulators, MCPA (2-methyl-4-chlorophenoxyacetic acid) and 2,4-D or DCPA (2,4-dichlorophenoxyacetic acid) were used on plots of (a) winter wheat growing in clay, little weed growth; (b) rye in sand, much camomile and tare. Conclusions are that DNOC can have a very good effect on the yield of both grain and straw. The straw yield of plants treated with plant growth regulators can be greatly reduced in comparison with untreated. DNOC treatment kills weeds much more quickly than treatment with plant growth regulators. The use of 2,4-D and MCPA in cereals should be restricted to the control of such weeds as fail to react under DNOC or calcium cyanamide. In winter cereals both 2,4-D and MCPA, with the exception of the esters, may be used; in summer cereals, which are more sensitive to hormone treatment, only MCPA—G.M.R.

Ferrari, G. L'acetosella. [**Wood sorrel.**] *Ital. agric.* **86.** 232. 1949. **1225**

This is a noxious weed in the southern regions. *Oxalis cernua* Thunb. is the species present in Rhodes where it is particularly harmful to herbaceous crops sown in autumn (cereals, forage crops). Damage is practically annulled if a turnover of the soil is effected when the plant has five or six leaves. The weed grows on alkaline soils.—E.B.

Shear, G. M. **Weed control in field corn.** *Sth. Plant.* **110.** 29. 1949. **1226**

Tests conducted at Blacksburg on time and method of applying 2,4-D, and combining spraying with cultivation compared with cultivation alone on the weeds smartweed, nut grass, crab grass, and foxtail grass among field corn, showed that satisfactory weed control was given only when spraying was done one week after the corn was planted. Nut grass was the only weed not controlled by this treatment. When corn was sprayed with 2, 4-D after the crop was growing, damage to the corn resulted. In such a case row crop attachments should be used to put the spray beneath the plants.

Best weed control was obtained when the field was sprayed before the corn came up. This was the only time when grass seedlings were killed. Low gallonage applications (5 to 10 gallons per acre) were best, provided the soil was smooth enough for uniform coverage.—K.O.

Padwick, G. W. **Chemical control of weeds.** *Indian Fmg* **9.** 497-500. 1948. [I.C.I. Ltd.] **1227**

The actions of many weed-killers such as methoxone, chloroxone and their different formulations on plants in general are considered. These hormone weed-killers which are commonly used in European countries to control weeds growing in grain crops can also be used under Indian conditions and a list is given of the most serious Indian weeds which can be controlled by this means. Several close-up plates show the outstanding success of using chemical sprays on the troublesome water-hyacinth (*Eichhornia crassipes*), which is rapidly killed even with small dosages. Wheat, rice, sorghum, and maize crops can all be effectively cleared of weeds by using these chemical controls.—M.E.E.

Watson, W. M. **Barberry eradication controls rust.** *Sth. Plant.* **110.** 26-7. 1949. **1228**

An extra 8 bu. of wheat from each acre of land with no increase in cost of production, no change in cultural practices or varieties grown, is the result of the control of stem-rust disease by the eradication of barberry (*Berberis canadensis*) in Virginia.

Barberry bushes start destructive local epidemics of stem-rust in fields of wheat, oats, barley and rye and new and virulent stem-rust races are produced on the leaves which may attack grain which was previously considered resistant—hence hindering the work of plant breeders in breeding resistant varieties.

In the control programme it is important that barberry-infested territory must be reworked one or more times before the operation is complete as the seed may remain dormant for 10 years.—K.O.

Petersen, H. I. Kan frø of flyve havre ødelægges. [**Can the seeds of wild oat be destroyed by grinding?**] *Ugeskr. Landm.* **94.** 55-7. 1949. **1229**

In Denmark in connexion with the use of foreign feeding grain which is contaminated with seeds of wild oat (*Avena fatua*) the question as to how these seeds can best be destroyed has become an urgent one. Investigations by the College of Agriculture, the State Seed Testing Station and the State Weed Research Station, indicate that virtually all the seeds can be destroyed by sufficiently fine grinding or rolling, but also that a very large portion of the seeds pass through the mill and rolling apparatus in a viable condition with the treatment which is generally employed in practice.—R.P.J.

McNeal, F. H. **Effect of 2,4-D on the yield and height of Federation wheat.** *J. Amer. Soc. Agron.* **40.** 1070-3. 1948. [Oregon Agric. Expt. Sta.] **1230**

The plots were 1 sq. rod in size in six-fold replication, with alternate hand weeded controls. Yields of wheat in bu. per acre were: control 35.5; weeded control 38.5; sodium salt of 2,4-D spray 35.1; ditto 2,4-D dust 34.0; methyl ester of methoxone spray 33.9; acid 2,4-D dust 33.7; methyl ester 2,4-D dust 33.1; ditto spray 31.3; acid 2,4-D spray 29.5. All differences except for sodium salt spray are statistically significant at 5 per cent level.

The spray treatments reduced plant height somewhat. Bushel weight was not affected.—K.J.S.

WELLS, S. A. and PLATT, A. W. **The effect of loose smut on the viability of artificially inoculated barley seeds.** *Sci. Agric.* **29.** 45-52. 1949. **1231**

Four varieties of barley were treated as follows. One lot of each variety was florally inoculated with chlamydospores of the loose smut organism *Ustilago nuda* (Jens.) K. and S. by means of a hypodermic needle; a second was inoculated with tap water; in a third the lemmas were punctured with the needle; and the fourth was left as a check. Compared with the check, the emergence of seeds inoculated with the organism was much lower, whereas those inoculated with water, or where the lemma was punctured were equally as high.

Approximately 400 seeds of each of 21 varieties were inoculated in a second experiment. In all, three such tests were conducted. Significant differences due to varieties and to tests were established. A significant positive relationship was established between stand and infection at maturity.

An examination of the embryos of inoculated seed showed that some embryos were almost completely destroyed by the invading mycelium. The percentage of embryos that could be recovered after treatment of the seed with sodium hydroxide was noted. Non-recovered embryos were presumed to have been destroyed by the fungus. A highly significant positive correlation of 0.769 was found between percentage of embryos recovered and percentage stand of comparable lots of seed.

It is pointed out that the amount of infection present on a variety at maturity depends not only on inherent resistance, but also on the ability of the seed to germinate and grow when the embryo is infected. Both factors need to be taken into consideration when the genetics of loose smut resistance in barley are studied.—Authors' summary.

ANDRÉN, F. Vårsädens betning. [**Disinfection of seed grain of spring cereals (in Sweden.)**] *Lantm. Svenskt Land* **33.** 205. 1949. **1232**

Where spring cereals are concerned it is a question of controlling *Fusarium*, loose smut of oats and stripe disease. Disinfectants include Aagrano, Betoxin 61, Betoxin F, Certosan, Panogen etc. The frequency of loose smut in wheat and barley appears to have increased in recent years in the Scandinavian countries. To keep these diseases under control it is necessary to employ hot water treatment. As regards other crops, disinfection of flax seed gives good results, in a dose of 300 grm. per 100 kg. All the disinfectants on the market are effective. The same applies to hemp seed.

Beet seed should also be disinfected to prevent "black leg."—R.P.J.

WESTON, W. A. R. D. **Diseases of cereals.** 21 × 14 pp. 79. London: Longmans, Green and Co. 1948. **1233**

This book gives a simple account of the most important fungal diseases attacking cereal crops in Britain, and should be most useful to the farmers and agricultural students for whom it is designed. It is very fully illustrated with simple sketches which explain the life histories of the organisms causing the diseases in a way which cannot be achieved by words.

A description is given of the methods of spread of the diseases considered. An historical account explains the development of modern methods of control, which are given for the various diseases. The account of the development of methods of seed treatment is particularly fascinating. A summary of the commonest cereal diseases with their symptoms and methods of control is given at the end of the book.—F. G. H. Lupton.

LAROSE, Em., JACQUES, A., and LOUNSKY, J. La lutte contre le Charbon nu des céréales (*Ustilago nuda* Jensen et *Ustilago nuda tritici* Schaf.) par la désinfection des semences à l'eau chaude. Application industrielle du traitement. [**Control of loose smut in cereals** (*Ustilago nuda* **Jensen and** *Ustilago nuda tritici* **Schaf.**) **by disinfection of seeds in hot water. Industrial application of the treatment.**] *Bull. Inst. agron. Gembloux.* **15.** 3-15. 1946. [Gembloux, Belgium] **1234**

Since immune or highly resistant varieties have not been produced, seed treatment is necessary. Disinfection by hot water treatment is a delicate operation. In the case of barley it consists of soaking in a bath of water at 46°C. for 50 minutes, then in another at 52.2°C. for 10 minutes. After cooling by dipping in cold water the seeds are dried in a kiln at 35-40°C. Wheat seeds are soaked first in a bath at 30°C. for 2 hours, then at 52.2°C. for 20 minutes. After cooling in cold water they are dried at 30 to 35°C. The procedure, as used on the large scale, is described.

Complete disinfection was obtained in nearly every case and the seeds retained almost normal power of germination, but reinfection of healthy plants was rather frequent, therefore yearly treatment is necessary.—D.B.

LANSADE, M. La désinfection des semences de céréales. [**Disinfection of cereal seed.**] 1948. pp. 11. **1235**

The fungous diseases of wheat, oats and barley are grouped as external and internal infections. In the first group spores attack the surface of the seed, in the second, infection takes place during flowering and penetrates to the embryo where the spores remain dormant until germination takes place. Treatments for the two types of infection are given. —D.B.

Kostoff, D. **Induction of cytogenetic changes and atypical growth by hexachlorocyclohexane.** *Science* **109.** 467-8. 1949. [Sofia Acad. Sci.] **1236**

Seedlings of cereals, legumes and brassicas were treated with commercial insecticides containing hexachlorocyclohexane (=benzene hexachloride) and with the pure gamma isomer, and their cytological effects studied. Their action on the cytoplasm and interference with the normal method of cell division recalls that of colchicine and other agents causing polyploidy. Increase in cell size accompanies cell proliferation, and changes may be induced in the nuclei ; polynucleate cells or cells with monstrously deformed nuclei may arise. Hexachlorocyclohexane acts on contact, and not at a distance as does acenaphthene. The danger to 'pure line' crops in the field is indicated. The material is recommended as a useful agent inducing polyploidy because of its cheapness.—K.J.S.

Kansas Agricultural Experiment Station. Bull. 332. **Smuts of cereal and forage crops in Kansas and their control.** By *L. E. Melchers*. 1948. pp. 36. **1237**

The characteristics and suggested controls of the following diseases are dealt with : corn smut, head smut of sorghum, loose smut of wheat, brown loose smut of barley, none of which can be controlled by chemical seed treatment ; also flag smut of wheat, stinking smut of wheat, kernel smut of sorghum, smut of oats, kernel smut of millet, covered smut of barley, black loose smut of barley, all of which respond to chemical seed dressing.

The chemical controls described are copper carbonate, New Improved Ceresan, Spergon, Arasan and formaldehyde, whilst non-chemical ones are hot water, rotations, burning diseased plants and use of resistant varieties.

There is no evidence that the feeding of smutted crops to live stock has a deleterious effect, but it should be borne in mind that the feeding of mouldy hay under certain conditions definitely has harmful effects.—G.M.W.

Watts, J. G. **Controls sand wireworm on corn.** *Sth. Plant.* **110.** 10. 1949. [S. Carolina Agric. Exp. Sta.] **1238**

The type of soil in which sand wireworm is found is sandy, low in humus content and has a low productive capacity. Corn, cotton and Irish potatoes suffer most from wireworm infestation, cowpeas, sweet potatoes, cantaloupes and water melons are seriously injured, and oats, rye and velvet beans are the most resistant crops.

The old control measures of fallowing the land, planting resistant crops, and rotations were only partially effective and permitted little latitude in the cropping programme.

Experiments at the Edisto Branch of the South Carolina Experiment Station, proved that 1 lb. of chlordane applied with a fertilizer, or diluted with inert clay gave more consistent wireworm control and increase in crop yield than did BHC, Toxaphene and DDT. The increase in corn yield following treatment, varied with the severity of wireworm infestation. At present the chlordane-fertilizer mixture can only be recommended for sand wireworm in corn, *Zea mays*.—K.O.

United States, Department of Agriculture. Fmrs' Bull. No. 1548. **The European corn borer—its present status and methods of control.** 1948. pp. 46. **1239**

The corn borer is causing considerable losses in corn crops, vegetables and flowers in North America. The damage done is mainly physical.

The natural enemies of the borer help little in its control and those introduced so far have had local success. Control measures suggested include feeding of the infected crop to stock either direct or as silage, ploughing in deeply and clearly, and burning. Whichever method is used it is essential to see that all the infected material is eaten, covered or burned.

Insecticides suggested are 100 to 200 gall. per acre of 4 lb. Ryania or 0.5 lb. DDT in 100 gall. of water sprayed just as the eggs begin to hatch and then three additional sprayings at 5 day intervals. —G.M.W.

Figueroa P., A., and Villamil G., F. Toxicidad del Gesarol A3 y del Agrocide Especial en *Sitophilus oryzae* L., *S. granarius* L., y *Sitotroga cerealella* Ol. [**The toxicity of Gesarol A3 and of Agrocide Special in relation to** *Sitophilus oryzae*, *S. granarius* and *Sitotroga cerealella*.] *Notas agron. Palmira* **2.** No. 2. 9-19. [English summary, p. 19] 1949. [Fac. Agron. Valle, Colombia (A.F.P.), and Ofic. Cent. Experimentación D.I.N.A. Colombia F.V.G.)] **1240**

Preliminary report on an experiment conducted jointly by the Agricultural Experiment Station at Palmira and the Faculty of Agronomy, Valle, Colombia. The efficacy of Gesarol A3 (DDT 3 per cent) and Agrocide Special (Gammexane) in controlling three of the most common insect pests of stored grain was compared. Doses of 0.300, 0.200, 0.100, 0.033 and 0.016 grm. per 500 grm. grain were applied. Of the two insecticides, gammexane produced a more rapid lethal effect. To obtain 100 per cent mortality, a higher dose of DDT than of gammexane is needed per equal weight of grain.—From authors' summary.

Trehan, K. N., and Pingle, S. V. **Moths infesting stored grains and their control.** *Indian Fmg* **8.** 404-7. 1947. [Received 1949] [Govt. of Bombay, Poona (K.N.T.), Storage Pest Scheme, Bombay (S.V.P.)] **1241**

The two most common moth pests on grains in

Bombay are *Sitotroga cerealella* and *Corcyra cephalonica*. The life history and bionomics of these species are explained; the cereals attacked include *Oryza sativa*, *Sorghum* sp., *Pennisetum typhoideum*, and *Triticum* sp. Damage by the pests was increased by the trade practice of covering stacks of grain with tarpaulin or gunny cloth during storage. Control, for small quantities of grain, against damage by either pest can be achieved by dusting with *Acoros calamus* in powder form. Where large scale control measures are required the use of water trays for trapping the moths is recommended. —M.E.E.

MOHR, J. C. v. d. M. **Some notes on the life history of the maize borer.** *Chron. Nat., Batavia.* **105.** 74-8. 1949. [Medan, Sumatra] **1242**

Pyrausta nubilalis Hb. has recently become a serious pest of maize on the east coast of Sumatra, where it is primarily a stem borer. Regional conditions favour a constant reproduction of the insects throughout the year. Maize is the only plant which can furnish all the nutrients necessary for the borer to complete its total life cycle, so that a close season of at least 2 months without maize, the fields being thoroughly cleaned during this period, is an effective means of control. The natural enemies of *Pyrausta nubilalis* are of minor importance.—From author's summary.

GUTIÉRREZ G., M. Consideraciones generales y experimentación preliminar sobre el cultivo y mejoramiento del maíz en la zona atlántica de Costa Rica. [**General considerations and preliminary experiments in the cultivation and improvement of maize in the Atlantic zone of Costa Rica.**] *Rev. Agric. Costa Rica* **19.** 5-11; 53-61; 151-7. 1947. [Diss. Fac. Agron., Univ. Costa Rica] **1243**

On the basis of eighteen months' study at the Inter-American Institute of Agricultural Science at Turrialba, Costa Rica, maize growing and breeding are discussed with special reference to the undermining of the plants by "root worms" or larvae of the genus *Diabrotica*. Normal cultural practice in the Atlantic coastal zone is somewhat inferior to that of the high central plateau of Costa Rica. Experiments in control have shown the middle of February, when the insect population is not heavy, to be the best time for sowing maize in the Atlantic region. A trial of chloropicrin proved the insecticide to be costly and ineffective; germination was reduced and growth was retarded. The application of DDT to the soil at the rate of 10 and 12 lb. per acre is under trial at present, while another experiment is testing the value of hilling the plants for preventing or reducing the lodging provoked by *Diabrotica*. Selection for resistant varieties has begun and two varieties, provisionally named Inst. 451 and Inst. 452, have been obtained and will, it is hoped, form a satisfactory basis for future breeding. An account is given of this preliminary work and suggestions for future work are made.—G.M.R.

RISBEC, J. and MALLAMAIRE, A. Les animaux prédateurs et les insectes parasites des riz cultivés en Afrique Occidentale. [**Predatory animals and parasitical insects of cultivated rice in West Africa.**] *Agron. trop.* **4.** 70-6. 1949. **1244**

Fish and birds are the most noxious among the predators. Numerous species of insects causing damage both in field and storehouse are indicated. Some advice on control is given.—E.B.

MALLAMAIRE, A. Maladies, plantes parasites et plantes infestantes des riz cultivés en Afrique Occidentale. [**Diseases, parasitic plants and weeds of cultivated rice in West Africa.**] *Agron. trop.* **4.** 77-80. 1949. **1245**

In case of a serious attack by *Sclerotium oryzae* Catt. it is advisable to burn all the haulms affected, to cultivate the soil and to maintain sufficient moisture in order to facilitate the destructive action of the soil micro-organisms. On rice fields under cultivation for many years and which are now approaching exhaustion, the disease caused by *Helminthosporium oryzae* is more serious: haulms and other crop residue should be burnt, a potassium fertilizer applied (an excess of nitrogen is dangerous), all infected parts left fallow or under pasture, and possibly the seeds disinfected. Several diseases of the ear and of the grain are indicated.

A number of species of *Striga* and *Rhamphicarpa fistulosa* are parasites of rice. The diffusion of these parasites takes place in conditions of deficiency in the crops, and methods for their control are the following: (a) to interrupt the cultural succession; (b) to maintain a cultivated fallow with manioc; (c) to grow for one year *Cassia occidentalis* L.; (d) to leave the plots under pasture or to supply manure. Among the numerous weeds is *Oryza barthii*, a plant of the natural rice field which invades the cultivated fields. *Oryza breviligulata* (sego) has a similar action. Other weeds belonging to the Gramineae are: *Digitaria horizontalis*, *Saccolepis interrupta*, *Panicum laetum*, *Echinochloa stagnina*, *E. pyramidalis*, and, among other families, *Cyperus* sp., *Scirpius* sp. *Hibiscus asper*, *Octodon filifolium*, *Ipomoea repens*. For weeds, other than Gramineae, treatment with a hormonic herbicide, such as 2,4-D at the start of vegetation (before the rice fields are submerged), is advised.—E.B.

BOURIQUET, G. Les maladies cryptogamiques et les principaux ennemis végétaux et animaux du riz à Madagascar. [**Cryptogamic diseases and principal vegetable and animal pests of rice in Madagascar.**] *Agron. trop.* **4.** 81-9. 1949. **1246**

Advice is given on control measures and water management.—E.B.

INDIAN FARMING. **Foot rot of rice in Madras.** *Indian Fmg* **9.** 418-9. 1948. **1247**

This disease of *Oryza sativa* which is one of the worst affecting the crop in Southern India is caused by *Fusarium moniliforme* var. *majus.* The crop can be affected at all stages but most destruction is done in the seedling stage. Overgrowth is a characteristic of diseased seedlings which eventually die, and total losses in nurseries and transplant fields are often considerable. The growth of resistant varieties as a means of control is not always practicable since the existing rice varieties are often better yielders and are adapted to the particular growing areas.

An effective method of control has therefore been introduced whereby the rice seed is put through a seed dressing machine containing Ceresan or Agrosan GN, or by mixing one gram of the fungicide with one pound of seed where only small quantities of seed are required.—M.E.E.

MOHR, J. C. v.d. M. **A note on the green rice moth, *Doloessa viridis* Zell.** *Chron. Nat., Batavia* **105.** 79-80. 1949. [Medan, Sumatra] **1248**

Larvae found infesting and injuring stored maize in Sumatra were identified as those of the green rice moth, *Doloessa viridis* Zell. A short study of the biology of this insect is presented. A Clerid beetle seems to be predacious on the larvae. Sacks previously employed for rice may be a source of infestation and should be fumigated or boiled before use.—G.M.R.

QUINBY, J. R., and KARPER, R. E. **The effect of milo disease on grain and forage yields of sorghum.** *Agron. J.* **41.** 118-21. 1949. **1249**

The symptoms of the disease, which is caused by the fungus *Periconia circinata* (Mang.) Sacc. are briefly described. The disease became widespread during the 1930's in the United States, but resistant strains of sorghum were quickly found and distributed, so that widespread losses were soon eliminated. Under irrigation in California and Kansas, losses up to 100 per cent are the usual result of growing susceptible varieties on infested land. In Texas it is more usual to find losses of 50 to 60 per cent than complete failure. It is stressed that whenever susceptible varieties of sorghum are grown, only the selected resistant strains of those varieties should be used.—T.D.H.

CASTELLANI, E. L'antracnosi del "teff." [**Anthracnose of teff.**] *Nuovo G. bot. ital.* **55.** 142-4. 1948. **1250**

Eragrostis tef is widely grown as a baking cereal in East Africa, and as a forage plant in various regions of Africa, Asia, America and Australia. The author describes a new disease which he calls "anthracnose" because of its characters and agent. Damage appears to be small, but is higher in humid zones. As a means of control, disinfection of the seeds is advised.—E.B.

KJELLANDER, E. Vetemyggan. [**The wheat midge.**] *Lantm. Svenskt Land* **33.** 495 and 508. 1949. **1251**

The wheat midge is one of the most serious pests in agriculture. It has occurred periodically in Sweden since the beginning of the nineteenth century. Trials are reported in which the wheat crops were sprayed with DDT preparations. Where the attack falls below 5 per cent, control is hardly remunerative, but is economic as soon as it amounts to 10 per cent or more.—R.P.J.

GASPARINI, M., and FIORI, G. Ricerche sperimentali sull'azione dello zolfo contro le ruggini del frumento nella pianura e nella collina toscana. [**Experimental researches on the action of sulphur against wheat rust in the plains and hills of Tuscany.**] *Ann. Ente consorz. interprov. toscano Sementi* **2.** 165-77. 1940. [Received 1948] **1252**

POPE, M. N. **Viviparous growth in immature barley kernels.** *J. agric. Res.* **78.** 295-309. 1949. **1253**

The normal development of barley seed is compared with the viviparous growth induced by supplying sufficient distilled water to the face of the kernel's exposed embryo surface. Ovules so treated on the seventh day after pollination developed similarly to normally growing ones up to the thirteenth day, except that after the ninth day the embryo of the treated ovule appeared to be more plump and turgid than that of the untreated ovule. Growth of the untreated embryo continues with no inflection of the growth curve. Vivipary is considered to be a primitive character, to be found in all the great divisions of the plant kingdom, and produced by any factor that will allow the access of water to the embryo. Dormancy of the mature seed is assumed to be instigated by structural factors that inhibit growth of the embryo by gradually cutting off its supply of water. The most likely factor blocking the passage of water to the embryo in barley is the starch-packed endosperm cells interpolated between the fibrovascular bundles lying in the still chlorophyllous tissue of the furrow and the embryo.—T.D.H.

LAUBENGAYER, R. A. **The vascular anatomy of the eight-rowed ear and tassel of golden bantam sweet corn.** *Amer. J. Bot.* **36.** 236-44. 1949. [Wabash College, Crawfordsville, Indiana] **1254**

Series of transverse sections demonstrate the transition from shank to ear, and the anatomy of the axis of the ear. In the transition region there is a distinct segregation of bundles, larger to the centre and smaller to the periphery. The inner system supplies the paired pistillate spikelets. The outer system completely surrounds the inner and forms the vascular supply of the glumes on the axis of the spikelet. Another series of sections shows the tassel at various levels from base to tip of tassel.

The work serves as a starting point from which comparisons of the vascular system of ears and tassels of various kinds of corn can be made. It is hoped that this will lead to a better understanding of the dual nature of the vascular system in the ear and help in relating the tassel and ear.—D.B.

HASKELL, G. **Application of probits to sweet corn earliness data.** *Science* **109.** 544. 1949. [John Innes Hort. Inst.] **1255**

Earliness in maize is estimated by date of first tassel appearance and date when half the population has silked; the former is used in England where very early plants are required for breeding purposes. Tassel date records were taken on plants from 4 sowings made at 28 day intervals and the percentage of plants in flower at a particular date for each sowing time was calculated and plotted. The curves are irregular but resemble the sigmoid growth curve. Percentages were transformed to probits and plotted against logarithm of flowering date; the dots are seen to be reasonably close to the best fitting straight lines (corresponding to true sigmoid curves). The 5.0 probit value on any line gives the theoretical date for half the population in flower and is an index of earliness, ike the 50 per cent in flower of untransformed data. Angles of the slopes of the various lines indicate too how rapidly a variety flowers when sown at different times.—K.J.S.

MOORE, R. F. **Downward translocation of phosphorus in separated maize roots.** *Amer. J. Bot.* **36.** 166-9. 1949. [Univ. Alabama] **1256**

Phosphorus is normally absorbed by the roots and translocated upwards to the shoot. Downward translocation was studied by the root-separation method and by shoot injection of a radioisotope of phosphorus. The conclusions are that "(a) there is a substantial downward movement of phosphorus in maize roots; (b) this movement occurs only fter phosphorus has been first translocated to the shoot; (c) downward movement of phosphorus to he roots is greater when the roots are growing in a phosphate-deficient medium; (d) the primary roots f maize plants have a greater phosphorus absorbing capacity (under the conditions of this experiment) than do the adventitious roots; and (e) there s a slight efflux of the phosphate anion from maize roots".—D.B.

RODRIGUES, L. C. A precocidade e os caracteres do embrião em *Zea mays* L. [**Earliness and the characters of the embryo in** *Zea mays* **L.**] *Agron. lusit.* **9.** 43-50. [English summary, p. 49] 1947. [Received 1949.] [Est. Agron. Nac., Sacavem, Portugal] **1257**

The length of ten cells of the scutellum epithelial layer were measured in ten kernels of eight varieties and two hybrids of *Zea mays* L. Correlations were sought between this measure and earliness. Under the prevailing conditions it seems permissible to conclude: (1) The number of kernels studied in each variety as well as the number of cells measured were quite sufficient. (2) The length of the scutellum epithelial cells of the maize embryo is a varietal characteristic. (3) There is no correlation between this characteristic and earliness.—Author's summary.

THIMANN, K. V. and BONNER, W. D., Jr. **Experiments on the growth and inhibition of isolated plant parts. II. The action of several enzyme inhibitors on the growth of the** *Avena* **coleoptile and on** *Pisum* **internodes.** *Amer. J. Bot.* **36.** 214-21. 1949. [Harvard Univ., Cambridge, Mass.] **1258**

The effects of various chemicals are summarized and the results show that generally speaking there is little about the oat coleoptile which cannot be generally applied to a dicotyledonous stem.—D.B.

HUECK, H. J., and VERMEULEN, G. **The sprouting damage of brewing-barley.** *Landbouwk. Tijdschr.* **61.** 227-33. [Dutch summary, p. 232.] 1949. **1259**

Attention is drawn to indications in the literature that inhibitory substances (inhibitors) play a part in the processes of germination and after-ripening in malting barley. A germination test for the estimation of these substances is described, barley grain extracts and coumarin being used as inhibitors. Some evidence was obtained that susceptibility to sprouting in different varieties of barley is dependent upon their content of inhibitory substances. The artificial inhibitor coumarin decreased this susceptibility. The inhibitory effect was shown to be largely dependent on temperature and to be *nil* at low temperatures. The fact that the inhibitory substances are easily washed out by water explains the occurrence of sprouting in wet weather.—From authors' summary.

ДАДЫКИН, В. П. О влиянии внешних условий на осмотическое давление клеточного сока растений. *Доклады Акад. Наук СССР.* Том 64. *No.* 4. стр. 571-3. 1949.

DADYKIN, V. P. [**Effect of external conditions on osmotic pressure of cell sap.**] *Doklady Akad. Nauk SSSR* **64.** 571-3. 1949. [Obrucev Inst. for Permanent Frost Investigation, Acad. Sci. USSR] **1260**

From culture experiments with barley and oats it is maintained that there is independence of entrance of water to the plant and of nutrient elements, as shown by the difference in depression of water and phosphoric acid absorption, as a result of which there is increase in concentration of mineral substances. The osmotic pressure of cell sap in barley and oats increases greatly under the influence of low temperature in the root zone. The increase is less in aerial parts of the plant but more in the roots. Increase of osmotic pressure is connected with the great depression of water absorption compared with that of phosphoric acid in cooled soils.—M.H.

BENNETT, Norah, and LOOMIS, W. E. **Tetrazolium chloride as a test reagent for freezing injury of seed corn.** *Plant Physiol.* **24.** 162-74. 1949. [Iowa State College, Ames] **1261**

Staining tests, involving reduction by living cells of 2, 3, 5-triphenyltetrazolium chloride to a coloured compound, were tried out as quick tests for viability.

The tetrazolium tests tended to give a high estimate of germinability particularly of badly injured seed. The method is not recommended for critical testing. "It provides a means, however, for estimating the severity of frost damage to corn within 2 hours instead of 1 or 2 weeks."—D.B.

ROSSMAN, E. C., and STANIFORTH, D. W. **Effects of 2,4-D on inbred lines and a cross of maize.** *Plant Physiol.* **24.** 60-74. 1949. [Iowa Agric. Exp. Sta., Ames] **1262**

The work was designed "to test possible varietal and development differences in the responses of corn to 2,4-D, and to study the possibility of deleterious effects in seed produced in treated parental plants and in plants of the succeeding generation."

Plants were sprayed at the six- to eight-leaf stage, tassel and ear shoot emergence, and 10 days after pollination. At the two later stages there were no visible effects on the above-ground parts, but when applied at the earlier stage there was leaf role, inhibition of brace root development, and defective tassel formation. Some inbred lines were more susceptible at this stage than others.

There were, however, serious reductions in seed yield and a decrease in seedling vigour when the parent plants had been sprayed at the first two stages.

The single-cross hybrid showed no response to 2,4-D until a detergent (Dreft) was added. Responses were then obtained as described above for the inbred lines.—D.B.

HAMILTON, Helen H. **A developmental study of the apical meristem in four varieties of *Avena sativa* grown at two temperatures.** *Amer. J. Bot.* **35.** 656-65. 1948. [331, Cambridge St., Ottawa, Ontario] **1263**

The developmental anatomy of the shoot from germination until panicle initiation was studied in four varieties of *Avena sativa* grown at constant temperatures of 16°C. and 28°C. The formative period of vegetative growth extends over the first 3 weeks indicating the importance of early environment. Leaf initiation in relation to the meristem internodal development, bud and adventitious root formation were observed. The meristem of *Avena sativa* possesses a dermatogen, hypodermis, subhypodermis and core. These regions become more definite in later stages of development. A single initial cell is not distinguishable but a group of initial cells with large nuclei is present at the tip beneath the dermatogen. Periclinal divisions of the dermatogen and hypodermis initiate new leaf primordia. Visible external characteristics of mature plants are determined by the pattern of internal differentiation in early ontogeny. Varietal differences in culm diameter are correlated with differences in the width of the meristem and young phytomers. Cells of young phytomers just at the back of the meristematic tip begin to elongate more rapidly in some varieties than in others. Varietal differences are also noted in the duration of the elongation period. These varietal differences in rate of maturation and elongation of the internodal cells may, to a large extent, determine the height of the plants, the length of their vegetative period of growth as well as the extent of adventitious root and tiller formation. Differentiation of tissues in the shoot occurs much earlier in plants grown at 28°C. than at 16°C. At the latter temperature growth follows the usual pattern but at the former, rapid maturation of tissues and internodal cells results in narrower culms and leaves, shorter internodes at maturity, fewer adventitious roots and tillers, and inhibited panicle initiation. Xylem differentiation occurs at a higher level in the provascular strands at 28°C.—Author's summary.

PAAUW, F. van der. **Water relations of oats with special attention to the influence of periods of drought.** *Plant and Soil* **1.** 303-41. 1949. [Agric. Exp. Sta. and Inst. Soil Res., T.N.O. Groningen] **1264**

Two sets of experiments are described in which "Eagle" oats were grown in Mitscherlich pots with controlled water supply. Transpiration rates, dry weight, leaf length, stem elongation, straw and grain yields and other characters are studied. In the first set, plants were grown in either "wet" or "dry" soil. After reaching the 4-5 leaf stage the water supply to some pots was modified giving four basic types of treatment—"wet-wet," "wet-dry," "dry-wet" and "dry-dry." The effects of light, temperature and relative humidity on the transpiration rate are discussed. Detailed results are given which suggest that a reduction in water supply is more damaging to the crop than a constantly limited supply.

The second set of experiments provided a period of drought (from 1 to 4 weeks) at various stages of the plant's development. A drought at the time of emergence of the panicle results in short stems, barren ears, reduced yields of grain, but greater thousand grain weights. An earlier drought has less effect on grain but reduces straw yields. Detailed results of these and other characters are given.—R.N.H.W.

Gerretsen, F. C. **Manganese in relation to photosynthesis. I. Carbon dioxide assimilation and the typical symptoms of manganese deficiency of oats.** *Plant and Soil* **1.** 346-58. 1949. [Agric. Exp. Sta. and Inst. Soil Res., T.N.O. Groningen] **1265**

Details of experiments on carbon dioxide uptake by oat leaves are given. Methods and apparatus are clearly described and the paper is well illustrated with photographs. Reduced assimilation was observed amongst manganese deficient plants. This was thought to be due to a direct role of manganese and not to the indirect effect of chlorosis. Other symptoms of manganese deficiency in oats are :—kinked leaves, necrotic spots, reduced starch and sugar content of leaves, increased susceptibility to frost damage, reduced respiration rates, increased nitrate content of leaves, increased permeability of cells to phenol red (used as a test for deficiency), reduced root development and the abundance of micro-organisms surrounding the root tip. The author regards all these symptoms as secondary effects resulting from the shortage of assimilates in the leaves.—R.N.H.W.

ДМИТРЕНКО, П. А. О значении анионов в питании растений аммиачным азотом. *Доклады Акад. Наук СССР.* Том 66. *No.* 11. стр. 85-8. 1949.

Dmitrenko, P. A. [**The importance of anions in nutrition of the plant by ammonium nitrate**] *Doklady Akad. Nauk SSSR.* **66.** 85-8. 1949. [Inst. Pl. Physiol. and Agrochem., Acad. Sci. USSR] **1266**

Under conditions of the experiments with oats, when comparatively large doses of N (in anion form not absorbed from the soil) are given to the plant, its development is depressed, but N nutrition absorbed from the soil as a salt containing the anion acts positively.—M.H.

Sircar, S. M., and Parija, B. **Studies in the physiology of rice. V. Vernalization and photoperiodic response in five varieties.** *Proc. nat. Instit. Sci. Ind.* **15.** 93-108. 1949. [Dept. Bot., Univ. of Calcutta] **1267**

Pot culture experiments on vernalization and photoperiodic response of three varieties of winter rice Rupsail, Patnai and Bhasamanik and of two summer varieties, Jhanji and Bhutmari, have been described. The treatments adopted are : (i) short-day exposure of seedlings for varying periods, (ii) pre-sowing low temperature treatment of seeds for different periods, (iii) pre-sowing low temperature followed by short-day treatment of the seedlings. Effects of these treatments on tillering, height, leaf number, ear emergence and number, grain setting and weight, and total grain yield have been studied.

Low temperature and low temperature followed by short days increased the tillering rate, height and the number of ear-bearing tillers in Bhasamanik and this was accompanied by increased grain yield. By short-day exposure an indication of increased number of ear-bearing tillers and grain yield was noticed in Jhanji, while the ear number decreased in Bhutmari, but the yield differences between the control and the treated plants are little.

Although tillering and the number of ears increased in Patnai by short-day treatment, the grain yield as compared with the control decreased because of the reduction in the number of grains set per ear.

Between short-day and control plants of Rupsail, there was not much difference in tillering, ear number and total grain yield.

Vernalization treatments resulted in acceleration of flowering of all the varieties except Jhanji. Response to the treatments is a varietal character.

A considerable reduction in the flowering duration of the main shoot of Rupsail from 133 to 47 days and of Patnai from 136 to 79 days was noticed. This was accompanied by a reduction in leaf and spikelet numbers and grain yield of the main shoot. After photoperiodic exposure the main shoots of these two varieties flowered much earlier than other tillers and a varying degree of earliness in the first and second tillers of Rupsail noted.

An attempt to explain the cause of this variation in the flowering of the tillers on the distribution and concentration of flowering hormone has been made.—From authors' summary.

Hedayetullah, S., Roy, K. P., and Sen, S. **A study on the effect of cultural factors in transplant paddy on the behaviour of some plant characters influencing the yield.** *Indian J. agric. Sci.* **17.** 69-80. 1948. [Agric. Res. Sta., Dacca] **1268**

In transplanting seedlings of *Oryza sativa* the important cultural factors affecting cultivation are the age of seedling, date of transplantation, distance between seedlings, number of seedlings per hole, and treatment of soil both in seed-bed and in transplant field. A study was made of variations in these factors and the changes wrought on the yield characters of the plants. Data have been statistically analysed and the results are presented and discussed. The two varieties employed, Latisal (early) and Tilakkachari (late), show distinct reactions to the same treatments and results obtained for the different plant characters have been carefully summarized.—M.E.E.

КАЛИНИН, Ф. Л. Развитие зародыша озимой ржи на эндосперме яровой пшеницы. *Доклады Акад. Наук СССР.* Том 60. *No.* 5. 905-7. 1948.

KALININ, F. L. [**Development of the embryo of winter rye on the endosperm of winter wheat.**] *Doklady Akad. Nauk SSSR.* **60.** 905-7. 1948. [Timirjazev Inst. Pl. Physiol., Acad. Sci. USSR] **1269**

This type of study has been carried out by many investigators who have shown that processes taking place in the endosperm exert a definite influence on growth and development of the embryo, and that the embryos, whether of a different genus or of the same plant, have a varied effect on further development of the plant. The present work is concerned with growing a grass embryo (1) on the endosperm of a different genus, (2) on its own endosperm, and (3) without endosperm. A table is given of plant height, number of spiklets in ear, number of florets, number of grain and weight of grain per plant for the variants. —M.H.

ÅKERMAN, Å. Fortsatta studier rörande höstvetets vinterhärdighet. [**Continued studies on winter-hardiness of wheat.**] *Kungl. LantbrAkad. Tidskr.* **88.** 156-87. [English summary pp. 185-6] 1949. **1270**

The severe winter 1946-7 was helpful to the work with autumn-sown wheat as it rendered possible a complete estimation of winter hardiness in the current wheat material at Svalöf and the branch stations of the Swedish Seed Association. It made possible also further control of the value of artificial frost treatment. As in the U.S.A., it was possible to establish good correlation between the results of ordinary field observations and artificial freezing.

A comparison between hardiness of the more important varieties has shown that among the varieties grown in south Sweden Weibulls Eroica is slightly more hardy than Skandia III. Both are superior to Skandia II and Standard. Hansa wheat appears to occupy an intermediate position between these.

Among the varieties intended for the northern parts of Götland and Svealand, Borg wheat has proved decidedly superior to Ergo. The new varieties Odin and Robur (01420) are more hardy than Ergo. New lines obtained from these varieties appear to compete successfully with the very hardy Virtus wheat.

No bred variety has yet been obtained which is as reliable as land wheat in regard to winter-hardiness.—R.P.J.

HOCKING, B. **Effect of crude benzene hexachloride on wheat seedlings.** *Nature, Lond.* **163.** 731. 1949. [Entomol. Dept., Univ. Alberta, Edmonton] **1271**

The adverse effects of benzene hexachloride on plant development have not been studied (except for the work of Stoker, *Ann. appl. Biol.* 35, 110, 1948) in regard to the identity of the constituent of the crude material which is responsible for the effects. Only the gamma isomer is recognized as important as an insecticide. If the effects of benzene hexachloride are due to some other constituent, the potentialities of the substance as an agricultural insecticide may be enhanced. The present work on wheat indicates that plant deformation is not due to the gamma isomer but may be a trichlorobenzene or some other volatile breakdown product of benzene hexachloride. Further study is in progress on the problem. Benzene hexachloride preparations for wheat seed treatment against wireworms should be materials of high gamma content. The hazards accompanying their use may be increased by storage after treatment, by exposure to sunlight, and by deficient moisture or high pH of the soil.—M.H.

СКРИПЧИНСКИЙ, В. В. и РУДЕНКО, Е. В. Значение факторов внешней среды и различных частей зерновки для прорастания физиологически незрелых семян пшеницы. *Доклады Акад. Наук СССР* Том 64. *No.* 5. стр. 723-5. 1949.

SKRIPČINSKIĬ, V. V. and RUDENKO, E. V. [**The importance of factors of the outer medium and of different parts of the pericarp for germination of physiologically unripe wheat grain.**] *Doklady. Akad. Nauk SSSR* **64.** 723-5. 1949. **1272**

The non-uniform ripening of seed and consequent after-harvest ripening have great theoretical and practical interest. Lysenko worked on this problem under Siberian conditions, and maintained that when the surrounding air is warmed, unripe seeds increase their capacity to germinate, thus making unnecessary the study of the biology of dormancy of seed, tubers, etc. In 1945, Kretovič published a work in which he concluded that improvement in the uptake of water and oxygen by the seed is a primary cause of increased germination at the time when temperature has only an indirect influence by facilitating increased solubility of oxygen in water. This theory has been disputed.

The present authors have therefore studied this problem of the role of water, oxygen and temperature with special regard to the internal cause of uneven ripening of seed. The data indicate that (1) physiological unripeness of seed is not due to difficulty of imbibing water; (2) the presence of oxygen in the water during seed soaking under low temperature stimulates in some measure the germination of unripe seed, but it is claimed that this is not a direct effect of oxygen; low temperature is not a physical but a biological factor which stimulates the seeds' internal complex of ferments and hormones. In a test to determine the effect on germination of slitting the seed coat of unripe seeds on dorsal and ventral surfaces, the data showed (a) a positive influence of ventral slitting and a negative effect of dorsal slitting; and (b) a favourable effect when the seed is planted with dorsal surface downwards, but an unfavourable result with dorsal surface uppermost.—M.H.

Oliva, A., and Modigliani Rossi, Alessandra. Il trattamento stimolante delle cariossidi di frumento con l'estratto del colchico autunnale. [**Stimulating treatment of wheat grains with extract of** *Colchicum autumnale.*] *Ann. Ente consorz. interprov. toscano Sementi.* **3.** 125-45. 1944. [Received 1949] **1273**

Gola, G. La fisiologia delle razze precoci Strampelli. [**Physiology of the Strampelli early wheat varieties.**] *Soc. Gen. Montecatini, Serv. tecn. agrar. Quad.* **No. 4.** pp. 45. [French, English and German summaries, pp. 43-5]. 1949. [Director Bot. Garden, Padua University]. **1274**

The author examines the various stages of development of the Strampelli varieties grown in the Po plain with winter nitrogen manuring, and particularly the first stages, viz. germination, winter phase, and spring rising phase. While the old varieties spend the winter in a complete suspension of activity, these early varieties make use of the short intervals of sun to continue the process of nutrition, which is dependent on the nitrates available in the soil. As the natural nitrification does not take place during the colder months, for these early varieties winter nitrogen manuring is essential for the complete development of the spike. Climate would also be responsible for the different behaviour of wheat in the Po plain and in Central Europe. The best time of sowing for the Strampelli varieties is dependent on the temperature which will follow, and therefore can only be determined with approximation. These early varieties avoid rust and premature ripening, and are higher yielding than the old varieties, but, because of their sensibility to temperature, are seriously affected by recurrences of spring cold. The first early varieties grown in the Po plain gave higher yields than in the region from which they originated (they were bred at Rieti, in Central Italy). But after a few years they declined and were replaced by other varieties. The author believes that a beneficial effect is derived from employing seeds from regions with a milder winter. —E.B.

Asana, R. D. and Mani, V. S. **On some physiological properties of extracts of wheat grains.** *Curr. Sci.* **17.** 360-2. 1948. [Indian Agric. Res. Inst., New Delhi] **1275**

Extracts from seeds of nine varieties of wheat were tested for root inhibiting properties; the main root of germinating maize when about 1.5 cm. long was the test object. The extract was obtained by soaking 200 or 10 grm. of washed, air-dry seeds in 30 cc. of freshly-boiled, cooled, distilled water for 3 hr. at room temperature. Of the nine varieties only *T. vavilovi* and Khapli liberated the growth-inhibiting substance; this showed auxin-like properties in the split coleoptile test (*Avena* test unavailable). Seeds of inactive wheat varieties liberated the inhibiting substance when the aleurone layer and testa were punctured, or made more permeable by hot water treatment.—K.J.S.

Dion, H. G., Spinks, J. W. T., and Mitchell, J. **Experiments with radiophosphorus on the uptake of phosphorus by wheat.** *Sci. Agric.* **29.** 167-72. 1949. [Dept. Soils, Univ. Saskatchewan, Saskatoon] **1276**

Three phosphate fertilizers ($NH_4H_2PO_4$, $Ca(H_2PO_4)_2$, and $Ca_3(PO_4)_2$) containing radiophosphorus were applied to wheat sown in calcareous soil in pots. Plants were analysed after 5, 11 and 17 weeks. The phosphorus uptake was highest from mono-ammonium phosphate and lowest from tri-calcium phosphate—all differences being significant at 5 per cent point at all stages. The final dry weights and total phosphorus uptakes however were not significantly different.

The results of earlier work at the University of Saskatchewan are outlined :—

(1) The main absorption of phosphorus occurs well before maturity.
(2) A 22 per cent recovery of phosphorus was obtained when applications were light, and the figure fell for heavier dressings.
(3) Application at sowing gives greater dry weight and greater phosphorus content than application at 2 or 4 weeks.—R.N.H.W.

Duff, G. H., and Forward, Dorothy F. **Physiological and biochemical studies in plant metabolism. I. The respiration of the seedling wheat leaf in starvation and ontogeny.** *Canad. J. Res.* Sect. C. **27.** 125-45. 1949. **1277**

Uniform conditions for the culture of the plants and for conducting starvation-respiration experiments upon the first seedling leaves permit the recapture, and hence thorough investigation, of transitory physiological states. A standard sample of isolated, mature leaves, so produced and starved, is shown to be heterogeneous when tested by the tempo at which the tissues in different parts of the sample pass through the colour changes that accompany starvation. These are correlated with respiration. Interleaf variation in tempo is relatively small. Intraleaf variation is maximal and the leaf is polarized at isolation but a complex redistribution of tempo within each leaf brings about depolarization and diminishes intraleaf heterogeneity as starvation progresses. The respiration of such a starving sample follows a time course of characteristic pattern, all the prominent features of which have their homologues in the corresponding patterns of younger and older leaves. The homologous characters undergo gradual modification with ontogeny. The respiration of the unstarved isolated leaf is very high and falls rapidly during growth but is low and declines slowly in maturity and senescence. At the transition from growth to maturity a slight, temporary rise in respiration occurs.—From authors' abstract.

PRILL, E. A., BARTON, Lela V., and SOLT, Marie L. **Effects of some surface-active agents on the growth of wheat roots in solutions.** *Contr. Boyce Thompson Inst.* **15.** 311-8. 1949. **1278**

Commercial emulsifying agents, melting agents, detergents etc. and soya phospholipides were used in various low concentrations in wheat seedlings grown in nutrient solutions. Three agents of the non-ionic type, Tween 20 and 85, and Carbowax 400 mono-oleate and soybean phosphatides show little effect at concentrations of 320 ppm. Saponin is strongly inhibiting. From substances of amonic type (Vatsol, Aquarex, Igepon and Nekal) are all strongly inhibiting at 20 ppm., but at 5 to 0.3 ppm Nekal is stimulating. The cationic type substances (Hydrocide, Isonol, and Katapol) are inhibiting at concentrations below 20 ppm. ; Katapol is stimulating at 1.25 ppm.—K.J.S.

NANCE, J. P. **A comparison of carbohydrate loss and carbon dioxide production during fermentation by barley roots.** *Amer. J. Bot.* **36.** 274-6. 1949. [Univ. Illinois, Urbana] **1279**

Barley roots in a continuous stream of CO_2-free N_2 gas produce large quantities of CO_2 in excess of the alcohol formed. The alcohol and a corresponding amount of CO_2 seem to arise from carbohydrate, while the " extra " CO_2 must arise from some other source, either proteins or organic acids. Values for total anaerobic CO_2 production are much lower when measured in a respirometer than when determined by the continuous gas stream technique.—Author's summary.

SURE, B., and HOUSE, Frances. **The relative biological values of the proteins in cereal grains.** *J. Nutrit. Phil.* **36.** 595-600. 1948. **1280**
See *Nutrition Abstracts.*

UNDERWOOD, E. J., COLEMAN, R. G., and CURNOW, D. H. **Carotene losses in curing and storing cereal hay.** *J. Aust. Inst. agric. Sci.* **14.** 175-9. 1948. [Inst. of Agric., Univ. of W. Australia (E.J.U. and R.G.C.), Dept. of Agric., W. Australia (D.H.C.)] **1281**

Two separate experiments to determine carotene losses were carried out with different cereals at the Meredin Research Station. In the curing experiment oaten hay of the Mulga variety was cured for various periods in the stook and the carotene content of the resulting product was determined. Most of the carotene was destroyed during the early months of curing and subsequent storage had little effect. A similar sharp loss of carotene was noted during the early period of the storage experiment conducted with wheat of the variety Charter. At the time of stacking, the wheaten hay contained 11.4 ppm. of carotene on a dry basis whereas after storage for 17 months the corresponding figure was only 1.2 ppm. Factors known to influence this large carotene loss are discussed. Early cutting of cereal hay was found to reduce carotene losses. By shortening the period of curing to a minimum and feeding as soon as possible after stacking, carotene was conserved, but this procedure was not comparable with a fodder conservation policy on the farm.—M.E.E.

WHISTLER, R. L., and WEATHERWAX, P. **Amylose content of Indian corn starches from North, Central, and South American corns.** *Cereal Chem.* **25.** 71-5. 1948. **1282**

Analyses of starch samples from 39 different Indian corns indicate iodine adsorption values of 44.4-56.6 mg. per gram of starch or amylose contents of 22.2-28.3 per cent, the average being 24-25 per cent. Thus, these starches have usual amylose contents.—Authors' abstract.

WOLF, M. J., MACMASTERS, M. N., HUBBARD, J. E., and RIST, C. E. **Comparison of corn starches at various stages of kernel maturity.** *Cereal Chem.* **25.** 312-25. 1948. [N. Reg. Res. Lab. Peoria, Ill.] **1283**

The starch content in the grain of Iowa Hybrid 939, Iowax 1, and Golden Cross Bantam varieties of corn increased in the interval from 12 or 13 days after pollination to maturity. The most rapid increase occurred in the period from 12 to 20 days after pollination. The average of the starch granule diameter in the period from 13 days after pollination to grain maturity rose from 2.7 to 9.9μ in the non-waxy dent corn, and from 3.0 to 9.1μ in the waxy corn. In the sweet corn, the corresponding values for the simple granules were 1.8 to 3.6μ. The water-binding capacity of the starches at 12 to 13 days was approximately 0.9 g. per g. of starch and diminished rapidly to about 0.3 g. per g. at 20 to 36 days. Over the period studied, the iodine-sorptive capacity of the non-waxy corn starches increased from 10 to 14 mg. per g. to 54 mg. per g. A low amylose content in starch from immature corn was verified by fractionation of starch from sweet corn 12 days after pollination. Two series of curves were obtained from Iowa Hybrid 939 and Iowax 1 corn starches respectively, by plotting light transmittancy against temperature as dispersions of the starches were heated. Simple sigmoid curves were obtained for all samples of both series of starches except the mature, non-waxy dent corn starch. The latter gave a transmittancy curve with two inflections.—Authors' abstract.

NASON, A. **Existence of a tryptophan-niacin relationship in corn.** *Science* **109.** 170-1. 1949. **1284**

This has been demonstrated by two experiments. Seeds of a genetically high-niacin maize were grown in nutrient solution supplemented with various combination concentrations of L-tryptophane and vitamin B_6. Data of niacin content show the niacin synthesis in excess of controls to be a function of L-tryptophane supply and to be independent of vitamin B_6 concentration. Niacin was increased by 64 per cent over control with 1000 mg. of L-tryptophane. An experiment in which L-tryptophane and vitamin B_6 were supplied individually confirmed that the tryptophane-niacin relationship is independent of vitamin B_6.—K.J.S.

FREY, K. J. **The inheritance of protein and certain of its components in maize.** *Agron. J.* **41.** 113-7. 1949. **1285**

IONITĂ, M., and SLUŞANSCHI, H. Influenţa distantei de semănat asupra continutului in proteina şi grăsime al porumbului. [**Influence of sowing distance on the protein and fat content of maize.**] *Anal. Fac. Agron. Cluj* **12.** 221-6 [French summary p. 226.] 1949. **1286**

In the course of research on this subject, it was possible to study phytotechnic action on the chemical composition of the maize grain, especially on its protein and fat content. For this purpose samples of Portocaliui maize grains (known for their high food value), gathered at Cluj in three consecutive years, were used. The plants, some of which bore only one ear, the others bearing two or three, were sown at distances varying from 100 cm. to 30 cm. Those at a distance of 50/60 cm. and 70/80 cm. were the most successful and as nearly all bore two ears it was attempted to estimate whether the higher or lower ears produced the greater protein and fat content. Results: (1) Protein and fat content increased as the sowing distance increased from 30/40 cm. to 90/100 cm: (2) the protein content is more affected than the fat content: (3) there is a connexion between the number of ears on a plant and the content of the seed, that is, plants with only one ear produce a better seed than those with two, while the seeds of two-ear plants are better than those of plants with three ears: (4) in the case of plants with two ears, the higher ear produces seed richer in fat content than the lower whereas the lower ear produces grain richer in protein content.—O.L.

SPENCER, E. Y., ROBINSON, A. D., MCELROY, L. W., and KASTELIC, J. **Collaborative analysis of wheat, oats and barley for thiamine and riboflavin.** *Canad. J. Res.* **27.** 194-8. 1949. **1287**

In the analysis of wheat, oats, and barley for thiamine and riboflavin by three collaborating laboratories an attempt was made to reduce inter-laboratory differences to a minimum by the establishment of a standardized procedure. The thiochrome and fluorometric methods were used for the thiamine and riboflavin determinations respectively. It was apparent that even after steps had been taken to standardize the assay procedures, small but consistent and significant inter-laboratory errors existed. Calculations indicate that differences of the order of 10 to 12 per cent in mean assay values were necessary before samples could be considered different with respect to their thiamine or riboflavin content.—Authors' abstract.

PEREIRA, A. Um método rápido de doseamento do azoto. Breve estudo sobre a sua adaptação à determinação da proteína no grão de trigo. [**A rapid method of determining nitrogen. Short study of its application to the determination of protein in the wheat grain.**] *Agron. lusit.* **8.** 205-12. [English summary, p. 211] 1946. [Received 1949] [Est. Agron. Nac., Sacavem, Portugal] **1288**

A simple, rapid and cheap method used by Lindner and Harley for the determination of nitrogen in leaves (*Science*, 96. 565-6. 1942) is applied to the determination of protein in wheat. The method is based (a) on a quick and complete digestion of comparatively small amounts of material by concentrated sulphuric acid and 30 per cent hydrogen peroxide, and (b) on a rapid determination of the total nitrogen in the solution by a colorimetric procedure. The protein values obtained by the above method and by the Kjeldahl-Gunning-Arnold method are compared. In an application of analysis of variance to a series of 35 samples of wheat no significant differences were shown between the means, and it is concluded that the rapid method may be successfully used for the determination of protein in wheat.—Author's summary.

OXLEY, T. A. **Study of the water content of single kernels of wheat.** *Cereal Chem.* **25.** 111-27. 1948. [Pest Infestation Lab. D.S.I.R., Slough, England] **1289**

Apparatus and technique are described which are suitable for the determination of the water content of single kernels of wheat in lots of 40 kernels at a time.

The standard deviation of each set of 40 water content results may be used to measure the range in water content. Wheat which has been stored in small containers (of the order of one litre or less) has a standard deviation in water content ranging from 0.13 to 0.41 per cent.

Distinction is made between a range of water content due to kernels being in equilibrium with different humidities (the " unsteady state ") and a range due to physical differences in the kernels giving differences in water content when all are in equilibrium with the same relative humidity (the " equilibrium state ").

The range of water content is temporarily increased by exposure of wheat to very dry or damp atmospheres which lead to rapid drying or damping of the kernels. This is evidence that the kernels differ in the rate at which they are able to exchange water vapour with the atmosphere.

In one case investigated (using a sample of a soft white Scandinavian variety " Als "), rapid drying produced a skew distribution of water content. This is evidence of skew distribution among the kernels of a character which affects the rate at which they exchange water vapour with the atmosphere. There are indications that this is also true of some other varieties studied.

Wheats of mixed origin were generally found to have a wider water content range in the equilibrium state than wheats derived from a single crop.

In a single study of a soft red wheat (Squarehead Masters), ears during ripening were found in general to dry out first at the apex and last at the base, although a few kernels near the base of an ear dried as quickly as apical kernels. The range of water content within a single " dead ripe " ear was found to be large (standard deviation 0.74), but this was probably partly an unsteady state due to incomplete drying out.—Author's abstract.

SCHRENK, W. G., and KING, H. H. **Composition of three varieties of Kansas-grown wheat. Mineral analysis of wheat and soil.** *Cereal Chem.* **25.** 61-71. 1948. **1290**

Three different varieties of wheat, grown in thirteen different locations in Kansas over a 3-year period, have been analysed for protein, ash, potassium, phosphorus, calcium, magnesium, sodium, manganese, iron, and copper. Soil samples obtained from the same locations were also analysed for the same constituents, except for sodium. Soil pH was also measured. Rainfall data, yield, and test weight were also reported.

The ash and mineral content of wheat grown in various locations within the State varies appreciably and is correlated in general with the available nutrients in the soil. Areas producing wheat of high mineral content produced the higher protein.

The mineral content was not greatly influenced by variety. The location at which the wheat was grown was much more important than variety. Localities producing high mineral content did so consistently, indicating that differences due to rainfall and other factors during the 3-year period did not significantly affect mineral content.

The increased ash content of western Kansas wheats was not due to any one element, but was the combined result of increases in each of the major constituents of the ash. A very high manganese content of wheat grain was noted from certain areas in 1943 but not in the following 2 years. Apparently conditions were favourable for the maximum intake of manganese in these areas during the 1943 season. The minor elements in wheat and soil did not show such a definite trend across the State as the major elements.—Authors' abstract.

SHETLAR, M. R. **Chemical study of the mature wheat kernel by means of the microscope.** *Cereal Chem.* **25.** 99-110. 1948. [Dept. Biochem. Univ. Ohio. School of Medicine] **1291**

The composition of the wheat kernel was investigated by microchemical methods *in situ*. Cellulose is present in large amounts in the walls of the epidermal, cross layer, and hyaline cells. Some is present in the walls of the aleurone cells, but only a small amount occurs in the testa layer. Lignin occurs in the middle lamella of the cross layer cells, in some of the epidermal cell walls, and in the wheat hairs. A layer of cutin is present on the epidermis of the wheat kernel, and the testa cell walls are heavily cutinized. Lipid material is present within the aleurone cells. Pectic compounds appeared to be present in all of the bran layers, being located either in the middle lamellae or in the cell walls adjacent to them. Protein material was found largely in the testa, aleurone cell contents, and starchy endosperm, being especially high in the aleurone layer.—Author's abstract.

NANCE, J. F. **Inhibition of salt accumulation in excised wheat roots by 2,4-dichlorophenoxyacetic acid.** *Science* **109.** 174-6. 1949. [Dept. Bot., Univ. Illinois, Urbana] **1292**

Plant material from 4-day old wheat seedlings consisted of 45 root segments each 15 mm. long (20 tips and 25 more mature sections per flask). Nitrate determinates show a marked inhibition of nitrate absorption by 10 ppm of 2,4-D within 3 hours ; 0.1 ppm was inhibiting. KH_2PO_4 at 0.001M enhanced the inhibition and this was not merely a pH effect though inhibition is greater at lower pH. Attempts to reverse the 2,4-D effect by addition of dyes and other compounds were successful only with citrate (at 0.05m. and pH 5.0) ; its reversal activity was demonstrated in the presence of 1 ppm of 2,4-D. KCl accumulation was also inhibited. A possible explanation in terms of the effect of 2,4-D on respirating components is discussed.—K.J.S.

Uttaman, P. **A preliminary investigation into the viability of immature embryos of corn under conditions of cold storage at freezing point.** *Curr. Sci.* 52-3. 1949. [Agric. Res. Instit., Coimbatore] **1293**

The investigation was carried out to see if cold storage at freezing point would aid the preservation of viability of the immature embryos of maize and if so for how long. A 3-week-old corn cob from an inbred stock, with husk intact was placed in the refrigerator immediately after harvest on Aug. 31st, 1947. The embryos were dissected out of their kernels and daily tested for viability. It would appear that the period of viability of a 3-week-old embryo kept at freezing point is about 2 to 5 months. This period probably varies for older or younger embryos. In this investigation embryos were obtained from a single ear. For confirmation, embryos should be tested from more than one ear and the tests repeated.—P.M.

Haskell, G. **Presoaking and cold hardiness in maize.** *Plant and Soil* **1.** 342-5. 1949. [John Innes Hort. Inst., Merton] **1294**

Seeds of four inbred sweet corns and one dent hybrid were soaked in tap water for periods from 12 to 60 hours and then set to germinate at either 40°F. or 60°F. Presoaking did not alter germination rate under cold conditions.—R.N.H.W.

Modigliani Rossi, Alessandra. Ricerche sperimentali sul potere germinativo dei frumenti maturati in avverse condizioni stagionali. [**Experimental researches on germinative power of wheats ripened in adverse climatic conditions.**] *Ann. Ente consorz. interprov. toscano Sementi* **3.** 55-80. 1944. [Received 1949] **1295**

Erwin, A. T. **The origin and history of pop corn,** *Zea mays* **L. var.** *indurata* **(Sturt.) Bailey mut.** *everta* **(Sturt.) Erwin.** *Agron. J.* **41.** 53-6. 1949. **1296**

Pop corn is considered to be a mutant of flint corn, and the author believes that the white man, rather than the Indian was the first to recognize its significance and utility. Historical and archaeological evidence indicates that pop corn was used by comparatively few of the Indian tribes. The Indians used parching corn which suited their purpose far better than pop corn, as while parched corn becomes brittle and is easily pulverized, pop corn is soft and spongy and is thus difficult to grind into flour.—T.D.H.

Rusconi, C. El maíz en las tumbas indígenas de Mendoza. [**The maize in the native tombs of Mendoza.**] *Darwiniana* **7.** 117-9. 1 pl. 1945. [Received 1949] **1297**

Maize cobs discovered by the author in pre-Hispanic, aboriginal tombs are described and illustrated. Most of the cobs are small and thin, except one which measures 130 by 20 mm., with 37 rows, and another which measures 76 by 26 mm. and has 22 rows of grain.—G.M.R.

Jonard, P. Essai de classification des blés tendres cultivés en France. [**Classification of soft wheats cultivated in France.**] 1936. pp. 264. [Received 1949] **1298**

КУДРЯВЦЕВ, В. А. Отношение ячменя к интенсивности освещения после окончания световой стадии. *Доклады Акад. Наук СССР* Том 60. *No.* 5. стр. 913-6. 1948.

Kudrjavcev, V. A. [**The relation of barley to intensity of light after completing the light stage.**] *Doklady Akad. Nauk SSSR.* **60.** 913-6. 1948. [Vologda State Pedagogic Inst.] **1299**

It has been observed that some plants (cereals, for example) under sufficiently long day, and other necessary conditions, but with weakened light intensity (in greenhouse or room conditions), are unable to complete their life cycle to the formation of fertile reproductive organs. To study the facts in detail, the author carried out tests with cultures of three barley varieties of different origin, namely, Pallidum No. 3454 from Abyssinia, Pallidum 016 from the Crimea, and Pallidum K 2/14 from Hibiny.

The data show that the light intensity necessary to a plant at a definite stage of development is closely connected with its geographical origin, and is one of the factors requisite for normal development. Development is retarded and formative processes in the spikes are interrupted by shading, not because of a deficiency of plastic substances but because of some other undetermined reason. Further study of the question is needed. —M.H.

РАЗУМОВ, В. И., ФЕОФАНОВА, Н. Д. и ОЛЕЙНИКОВА, Т. В. Яровизация озимых злаков при отрицательных температурах. *Доклады Акад. Наук СССР* Том 60. *No.* 4. стр. 693-5. 1948.

Razumov, V. I., Feofanova, N. D., and Oleĭnikova, T. V. [**Vernalization of winter cereals by negative temperatures.**] *Doklady Akad. Nauk SSSR.* **60.** 693-5. 1948. [All-Union Inst. Plant Production, Acad. Agric. Sci., USSR] **1300**

In 1935, work in the physiological laboratory of VIR was conducted to determine the capacity for completing vernalization of winter cereals sown at the normal time for winter sowings. The tests showed that winter wheat and rye do not complete the vernalization stage (in Puškin) by the onset of settled winter weather. In such sowings the stage is not completed until December-January under a snow cover in frozen soil. Data on this subject have been discussed by Tumanov (*Herb. Abstr.* 10. Abs. 1887).

In 1946 work in the above Institute was continued to study the significance of negative temperatures on the process of vernalization, with special reference to examining under laboratory conditions the capacity of plants to pass through all stages of vernalization and pre-vernalization in such temperatures. Vjatka winter rye and Lutescens 329 wheat were the plants used.

The data show that subjecting the plants for a period of 106 days to −3.8°C. may completely vernalize both rye and wheat. At −6°C. rye is vernalized to a much less degree than at −3.8°, while wheat in these conditions is not completely vernalized, irrespective of duration of treatment. Thus results of earlier work are confirmed by the indication that vernalization may be effected by temperatures of an average about −4°, which occur in winter in the northern regions of USSR under a deep cover of snow (30 to 40 cm.).

Complete vernalization may take place with change of temperature from optimal (+2°) to negative amounts. In a test of treatment for 78 and 68 days, of either only −3.8° and −6°, or of a combination at the beginning (for 15 or 5 days) of optimal temperature and at the end (63 days) of negative temperatures, there resulted in both wheat and rye a greater percentage of viable seed when subjection to negative temperatures was preceded by treatment at +2°.

It is confirmed that vernalization of wheat and rye under normal sowing conditions in the north and central regions of USSR proceeds in two periods, namely, the autumn when vernalization is effected with temperatures above 0° and the winter when there is some preliminary vernalization with negative temperatures. Under this regime of temperature such pre-vernalization may be completed rapidly with the extremely low temperatures of −6° or lower.—M.H.

ARAKERI, H. R. **The influence of rainfall during the different growth phases on the yield of Bajri in Poona for fourteen years.** *Indian Ecol.* **2.** 6. 1947. [Agric. Met. Sect., Met. Office, Poona] **1301**

Rainfall during the presowing period does not affect the yield of *Pennisetum typhoideum*, but affects the date of sowing. The rainfall during the germination period, especially within the first 3 or 4 days after sowing, results in poor germination and low yield. For good vegetative growth the rainfall should be between 3 and 9 inches. Rainfall less than 3 inches or more than 9 inches adversely affects the yield of the crop. Six inches of rainfall, well distributed over the whole growing period, is conducive to very good yields of both grain and fodder. Heavy rainfall during the flowering or ripening period results in low yield especially of grain and is also likely to cause lodging of the crop.—Author's conclusions.

ЛИВАНОВ, К. В. Длина световой стадии у стандартных сортов яровой пшеницы и особенности их формообразования на коротком дне. *Доклады Акад. Наук СССР* Том 59. *No.* 1. стр. 179-81. 1948.

LIVANOV, K. V. [**Length of the light stage in standard varieties of spring wheat and characteristics of their formation in short day.**] *Doklady Akad. Nauk SSSR* **59.** 179-81. 1948. [Krasno Kut State Select. Sta., Saratov Province.] **1302**

In order to determine the length of the light stage in days in the standard varieties Melanopus 069, Erythrospermum 841 and Lutescens 062, a special test was carried out in 1936 at the above Station. Vernalized seed was sown at the beginning of June, when temperature was suitable for passing the light stage. At the time of emergence the plants were subjected to 24-hour day for 5, 10, 15, 20 and 25 days, after which they were transferred to 8-hour light day. The controls were grown in 24-hour day up to earing. The following results were obtained:

	1st sowing			2nd sowing		
	069	841	062	069	841	062
	DATE OF EARING					
Control normal day	16/7	14/7	12/7	17/7	15/7	13/7
25 day + 8 hr. day	19/7	16/7	16/7	22/7	18/7	17/7
20 day + 8 hr. day	23/7	24/7	20/7	25/7	26/7	21/7
15 day + 8 hr. day	no earing	10/8	25/7	no earing	20/8	26/7
10 day + 8 hr. day	,,	no earing	10/8	,,	no earing	24/8
5 day + 8 hr. day	,,	,,	no earing	,,	,,	no earing

Melanopus 069 requires not less than 20 light days of 16 hours. Erythrospermum 841 requires for this advancement not less than 15 light days of 16 hours. The light stage in Lutescens 062 is somewhat shorter than in 841 and constitutes not less than 12 to 15 light days of 16 hours.

Some malformations in the test material occurred, such as ear deformation and branching stems. The reasons for these are discussed. Ear deformation is attributed to prolonging the period from ear initiation to emergence by absence of suitable conditions for proceeding to the light stage.—M.H.

PETERMANN, N. Influenza della varietà, del clima e del terreno sulla produzione e la qualità del grano. [**Influence of variety, climate and soil on production and quality of wheat.**] **n.d.** pp. 8.— **1303**

LEGUMES

PRETIS, E. de. Il piano inglese delle arachidi. [**The British groundnut scheme.**] *Riv. Agric. subtrop. e trop.* **42.** 99-108. [English summary, p. 108] 1948. **1304**

An account of the plan is given.—E.B.

DUBOIS, J. Méthode de prospection et de cartographie des sols employée au Sénégal pour la recherche des terres à arachides.] [**Method of prospection and cartography of the soils employed in Senegal for the research of land suitable to groundnut.**] *Bull. agric. Congo belge* **40.** 627-40. 1949. **1305**

The plan for the development of oil crops in French overseas territories schedules in Senegal the mechanical cultivation of groundnut over 200,000 ha. of land, which must previously be cleared. This article gives account of the information acquired by this method. Many aerial photographs are included.—E.B.

FLORIDA Agricultural Experiment Station. Bull. 432. **Peanuts in Florida. 1. Peanut growing. II. Chemical composition of the peanut plant.** By *G. B. Killinger* et al. 1947. pp. 47. **1306**

The peanut prefers a clean, well prepared seedbed on a sandy loam and it will not do well on the same land for successive years. Small amounts of fertilizer will increase the yield and a top dressing of gypsum may prove advantageous. There are three main types, Jumbo, Runner and Spanish peanuts. Before planting, the seed is usually treated with a chemical such as Spergon but is not inoculated. It is planted any time when the frosts have finished until June at about 30 lb. shelled peanuts per acre in rows 30 inches apart with the plants 6 to 8 inches in the row. They are kept well weeded and cultivated till "pegging" starts. Most danger from insects is from leaf hoppers and velvet bean caterpillars, and from diseases such as leafspot (*Cercospora* spp.), both of which can be moderately controlled by sulphur dusting.

Peanuts are harvested from August to October depending on the type, by digging, side-raking and turning, allowing to wilt for a few days and then stacking on tripods to dry for 4 to 6 weeks. After this they are picked by one of two types of mechanical picker.

Experimental results are given as to the effect of gypsum, spacing, waste pond phosphate, fertilizer and sulphur and copper sulphur dusts on the crops.

In Part II an experiment concerned with the nutrient uptake of the peanut at various stages of growth is described; the results obtained are tabulated and discussed.—G.M.W.

HENNING, P. D. **Lupines in the winter-rainfall area.** *Fmg S. Afr.* **24.** 227-30. 1949. [Stellenbosch-Elsenburg Coll. Agric.] **1307**

A general account of varieties of lupins and advice in cultivation of the crop in this area. There are brief notes on the utilization of the crop as (a) green manure, (b) pasture crop, (c) a concentrate feed.—P.M.

PRELLER, J. H. **Lupines.** *Fmg S. Afr.* **24.** 25-9. 1949. [Coll. Agric., Potchefstroom] **1308**

A popular article dealing with description of varieties, climate and soil essentials, planting methods, time of planting, fertilization, cultivation, seed inoculation, harvesting and uses of the seed.—P.M.

LAGOS U., J. A. Cultivo del maní. [**Cultivation of the groundnut.**] *Rev. Agric. Costa Rica* **20.** 317-8. 1948. **1309**

A short description of *Arachis hypogaea* and exposition of cultural conditions, requisite tillage, sowing, cultivation, manuring, harvesting, utilization and yield. It is recommended for inclusion in a cropping system with maize and tobacco, or for intercropping in coffee or other plantations on account of its nitrogen-fixing properties.—G.M.R.

BATTEN, E. T. **Peanut production.** *Sth. Plant.* **110.** 16-7. 1949. [Agric. Exp. Sta. Holland, Virginia] **1310**

Soil type and drainage are particularly important in the production of Virginia type peanuts. Spanish and small Runners do fairly well on the heavier, poorly drained soils while Jumbos and large Virginia Bunch do better on Norfolk, Sassafras and well-drained Onslow soil types.

The article includes descriptions of soil preparation (the most desirable pH is 5.8 to 6.2), plant food requirements, spacing of plants and pest control of the peanut crop.—K.O.

FEASTER, C. V. **Influence of planting date on yield and other characteristics of soybeans grown in southeast Missouri.** *Agron. J.* **41.** 57-62. 1949. **1311**

The effect of the date of planting of five varieties of soybeans representative of those grown in south-east Missouri was noted on yield, seed quality, percentage oil, iodine number of the oil, and on percentage protein. The influence of the date of planting on the time required to reach maturity is much greater in early than in late maturing varieties, but if planting is delayed until the first week in July, the use of an early variety will only advance maturity slightly in comparison with full-season varieties. Early planting of full-season varieties also only slightly advances maturity, so that these studies indicate that early maturity will only be achieved by planting early maturing varieties at an early date. Ralsoy and S100, the two latest maturing varieties tested, gave superior yields to the others tested irrespective of the planting date. The best date for planting each variety, as indicated by superior yield, becomes later as the natural number of days required for maturity decreases. The date of planting had little effect on the seed quality of the full-season varieties, but early maturity, obtained by planting short-season varieties early, was associated with inferior seed quality.—T.D.H.

ILLINOIS Agricultural Experiment Station. Bull. 529. **Legumes and grasses for silage. A report of experiments.** By *W. B. Nevens*, *K. E. Harshbarger*, and *K. A. Kendall*. 1948. pp. 27. **1312**

Results are given of experiments carried out in Illinois to determine the conditions needed to ensile successfully a number of crops other than corn (*Zea mays*), which is accepted by Illinois farmers as the best crop for silage. The yield, optimum harvest time and the most satisfactory means of ensiling are especially noted.

The crops used in the tests were alfalfa (*Medicago sativa*), brome grass (*Bromus inermis*), broomcorn (*Sorghum vulgare*), oats (*Avena sativa*), sorghum (*Sorghum vulgare*), soybeans (*Soja max*), Sudan grass (*Sorghum vulgare* var. *sudanense*), and winter rye (*Secale cereale*).

The highest yields came from corn and the sorghums. Some sorghum varieties may outyield adapted corn hybrids in tons of dry forage. After the brush is removed, broomcorn forage may equal corn forage in weight, although the characteristics and yields of the various broomcorn varieties vary widely. First cutting alfalfa and soybeans usually yield one-half to two-thirds as much dry feed as good corn hybrids. Sudan grass yields approach those of hybrid corn; lowest yields in the trials came from oats and winter rye.

Characteristics such as best harvest stage and best type and amount of preservative to use varied with each individual crop and specific recommendations are given under the heading of individual crops for methods of making the best silage with that crop.

Substances which proved effective in increasing palatability and improving keeping quality of the various silages were: cane (black-strap) molasses, corn molasses and ground cereal grains. Substances which proved ineffective or of little value as preservatives were: ammonium carbonate, ground corncobs, lactic acid culture, sodium sulphate and urea.—G.M.W.

SABNIS, T. S., MEHTA, T. R., and MEHTA, Y. R. **Improvement of gram in the United Provinces.** *Indian Fmg* **8.** 328-32. 1947. [Received 1949] **1313**

Among the pod grains of India, gram or *Cicer arietinum* takes fourth place both in acreage and production, and it is important both for human and animal consumption. Many local varieties are cultivated and for nearly 20 years breeding work on this plant has been undertaken by the Agricultural Department of the United Provinces. Certain crosses and hybrids are recommended for their particular qualities and yields of four selected varieties are compared.—M.E.E.

BRADY, N. C. **The effect of period of calcium supply and mobility of calcium in the plant on peanut fruit filling.** *Proc. Soil Sci. Soc. Amer.* **12.** 336-41. 1947. **1314**

See *Soils and Fertilizers.*

STRAUSS, J. L., and GRIZZARD, A. L. **The effect of calcium, magnesium and potassium on peanut yields.** *Proc. Soil Sci. Soc. Amer.* **12.** 348-52. 1947. **1315**

See *Soils and Fertilizers.*

TREMBLAY, F. T., and BAUR, K. E. **A method of determining the potassium requirements of peas.** *J. Amer. Soc. Agron.* **40.** 945-59. 1948. **1316**

A rapid diagnostic method used for peas grown for processing by freezing consists in sampling and analysing leaf blades and petioles selected at the third node down from the top of the plant when it has reached an 8 or 9 node stage. Data showing the increased uptake of potassium by the pea plant supplied with increasing amounts of potassium are recorded. Potassium concentrates in the plant were unaffected by the application of 15 to 30 lb. N and 30 to 60 lb. P_2O_5 per acre, provided that potash dressings were adequate.—K.J.S.

FIELDING REED, J. and BRADY, N.C. **Time and method of supplying calcium as factors affecting production of peanuts.** *J. Amer. Soc. Agron.* **40.** 980-96. 1948. [N. Carolina Agric. Exp. Sta.] **1317**

The calcium supply of the soil is the most important single factor in the production of large-seeded type peanuts. Percentage ovarian cavities filled is a sensitive index of calcium supply. The present study records calcium levels in soils and peanut tissues under treatment by varying dressings of dolomite limestone and gypsum. The conclusions are that on soils of low calcium level, broadcast applications of limestone result in a larger plant with production of more gynophores. The percentage ovarian cavities filled is also increased, but the effect is less the second year than the percentage fill resulting from gypsum applied annually to the fruiting area. Under such conditions lime should be applied for its effect on plant growth and size, supplemented by gypsum to insure maximum fruit fill.—K.J.S.

СОКОЛОВ, Г. М. Хранение семян люпина. *Совет. Агрон.* 1949. *No.* 2. стр. 90-3.

Sokolov, G. M. [**Storing lupin seed.**] *Sovet. Agron.* 1949. No. 2. 90-3. [Moscow Inst. for Mechanization and Electrification of Agric.] **1318**

In some collective farms of the Moscow, Rjazansk and Smolensk provinces there is a tendency to store unthreshed lupin seed in heaps. This is unsatisfactory because moisture increases by 18 to 20 per cent and germination capacity decreases by 48 to 50 per cent. Storing of seed as grain is somewhat better, but is not recommended.

Seed with high moisture content should be stored in special containers. Tests have shown that this lowers moisture to about 5 per cent and increases germination capacity. When lupin seed is stored with cereal grain, results are satisfactory because the grain lowers lupin moisture content. A specially constructed barn is described by which speciality freshly harvested lupin seed (not completely ripe) can be stored under conditions in the north.—M.H.

Sicily, Stazione Sperimentale di Granicoltura. Publ. No. 7. Ricerche sull'Orobanca della fava. Nota 1. Sulla germinazione del seme. [**Researches on *Orobanche* of bean. Note 1. Seed germination.**] By *E. Del Guidice.* 1935, pp. 27. [Received 1948] **1319**

Ball, E. **Differentiation in the primary shoots of *Lupinus albus* L. and of *Tropaeolum majus* L.** [Contained in] Symposia Soc. Exptl. Biol. No. 2. Growth in relation to differentiation and morphogenesis. 246-62. 1948. [Univ. North Carolina, Raleigh] **1320**

From experiments in which the shoot apex of *Lupinus* is cut into quarters by longitudinal slits, it is suggested that none of the cells of the apex has a specific unalterable destiny. Isolating the shoot apex by longitudinal cuts inside the zone of the youngest foliar primordia has indicated that the apex is an independent, self-determining meristematic region.—M.H.

Greulach, V. A., and Singh, S. **Some effects of nonherbicidal concentrations of 2,4-D on the development of the bean plant.** *Science* **109.** 336-7. 1949. **1321**

Morphological changes and the delaying and inhibiting effects of 1, 5 and 10 ppm. concentrates of 2,4-D on the reproductive development of *Phaseolus vulgaris* (var. bountiful) are described. Leaves showed epinasty typical of growth substances, and abscission was promoted. Flowers and buds, pods and seeds were reduced significantly by 5 ppm. treatment but vegetative development was increased. Total dry weight was not decreased significantly but weight of reproductive organs was reduced and weight of seed generally fell with increased 2,4-D concentration.—K.J.S.

Christiansen, G. S., Kunz, L. J., Bonner, W. D. Jr., and Thimann, K. V. **The action of growth inhibitors on carbohydrate metabolism in the pea.** *Plant Physiol.* **24.** 178-81. 1949. [Harvard Biological Laboratories, Cambridge, Mass.] **1322**

The growth inhibitors used in the presence of auxin were iodoacetate, arsenite and fluoride. Respiration falls off steadily with time in all solutions. Auxin (indoleacetic acid) causes a definite increase of 15 per cent in respiration rate. The three inhibitors, when used at a concentration producing a growth reduction of one-half, all lower respiration rate at first. Only with fluoride was the final rate higher than that of the controls. With this last exception, the inhibitor evidently does not promote the destruction of sugar by respiration.—D.B.

ПОРУЦКИЙ, Г. В. Влияние пуриновых оснований на усвоение азота растениями гороха. *Доклады Акад. Наук СССР* Том 64. *No.* 1. стр. 103-6. 1949.

Poruckiĭ, G. V. [**The influence of purine elements on assimilation of nitrogen by peas.**] *Doklady Akad. Nauk SSSR.* **64.** 103-6. 1949. [Inst. Pl. Physiol. and Agrochem., Acad. Sci., Yk. SSR.] **1323**

Purine elements (adenylic acid, adenine) play an important role in the metabolism of many plants, especially legumes, and many species of bacteria. It is postulated, therefore, that adenylic acid may affect the inter-relationship of leguminous plants and nodule bacteria in the assimilation of atmospheric nitrogen. To study this problem Viktoria Mahndorf peas of uniform size and weight were soaked in 0.001 per cent mixed solutions of adenylic and indole-3-acetic acid (A in table), and in adenylic acid alone (B in table). After soaking for a day the peas were placed in tin vessels with 3 kg. of sterilized sand, of pH 7.5. Salts were added to the sand according to the Prjanišnikov method, but excluding nitrogen, and with the addition of 1 cm.^{3} 0.01 per cent solution of boric acid per 1 kg. sand. Moisture of the sand was kept at 60 per cent of saturation. Germination of the cultures was uniform, but the variant with indole-3-acetic acid developed an intense green colour. Chlorophyll analysis was made by the spectrocolorimetric method of V. N. Ljubimenko, and the following data were obtained :

	Amount of chlorophyll (in mg.) per grm. green wt. of leaves			
	No. of days of vegetation			
Variant	15	30	45	60
Control	1.73±0.43	3.17±0.28	4.23±0.27	4.19±0.41
B	2.97±0.22	2.72±0.61	3.47±0.54	3.23±0.29
A	2.47±0.34	3.89±0.35	5.21±0.68	4.88±0.72

There is indication that the amount of N in nodules and green plants in the different variants is not uniform at different vegetative periods. This inter-relationship between plants and bacteria is conditioned by various factors, chiefly stage of plant development and the chemical nature of tissues. An analysis was made to elucidate the nature of this inter-relationship and further tabulated data record (for the variants A and B) days of vegetation (15, 30, 45, 60) ; no. of nodules per plant ; average weight of one nodule (mg.) ; content of growth substances in nodules ; wt. of plants' green mass ; and content of growth substances in the plant. It is concluded that for variant B there is during the first vegetative period a transference of vigour to the plant because conditions are not suitable for development of *Rhizobium.* This conflicts with the views of Korsakova and Konokotina in *Trudy Vsesojuz. Inst. S.-H. Mikrobiol.* 2. 1936. For variant A the accumulation of green mass proceeds more slowly and the content of active acids in the plants is lower than in the nodules. The number of nodules, on the contrary, is somewhat greater and they are characterized by larger size and weight than in variant B, especially towards the end of the vegetative period. This conforms with other observations.—M.H.

BLEDSOE, R. W., COMAR, C. L., and HARRIS, H. C. **Absorption of radioactive calcium by the peanut fruit.** *Science* **109.** 329-30. 1949. [Florida Agric. Exp. Sta.] **1324**

Peanut plants were grown with roots and fruiting organs in separate containers and media. There were 4 replications of 8 plants for treatment. Rooting and fruiting zones received complete nutrient solution to which labelled calcium was added once at 110 days ; the fruit zones received this for 9 days and the roots for 24 days. The results show very little labelled calcium entering the plant through the roots except into the young peg (gynophore and ovary), but very active absorption by the gynophores and shells and seed of labelled calcium applied to the fruiting zone.—K.J.S.

HARRIS, H. C. **The effect on the growth of peanuts of nutrient deficiencies in the root and the pegging zone.** *Plant Physiol.* **24.** 150-61. 1949. [Univ. Florida, Agric. Exp. Sta., Gainesville] **1325**

Root-hair-like growths have been observed on the gynophore of peanuts. The possibility of absorption through the gynophores has been suggested. An investigation was undertaken to compare nutrient requirements of the root system and gynophore (the fruit system). Peanuts were grown in sand culture with the roots completely isolated from the gynophores so that a different nutrient solution could be applied to the roots and to the gynophores at the same time. Various nutrients were withheld from the root and fruit systems during the last 51 days of growth. Results lead to the conclusion that for the best production of nuts there should be a balanced supply of nutrients for the root system and a supply of calcium and sulphur for the gynophores (fruit system). There was no consistent relationship between top growth and nut production.—D.B.

YIN, H. C., and SUN, C. N. **Localization of phosphorylase and of starch formation in seeds.** *Plant Physiol.* **24.** 103-10. 1949. [Nat. Peking Univ., China] **1326**

Soybean was chosen as test material because of the absence of detectable starch which interferes with the test in the dormant seeds and in the first few days of germination. Castor bean also has this advantage. Phosphorylase activity and starch formation were studied histo-chemically. "Phosphorylase reaction is most intense in the root cap, less in the root tip and the lateral buds, still less in the hypocotyl and the stem tip and very little in the cotyledons. Upon germination, starch is found first in the young leaves. The general coincidence of the sites of phosphorylase activity with those of starch formation indicates that the enzyme is responsible for the synthesis of starch during germination. Minor discrepancies are perhaps due to the availability of the substrate, the efficiency of the phosphorylating mechanism, or other conditions in the tissues. Cytological observations show that phosphorylase is exclusively localized in the plastids. These observations further confirm the contention that phosphorylase is the normal physiological mechanisms of starch formation." In this respect phosphorylase is unlike other enzymes.—D.B.

IWANOFF [IVANOV] N. N. Biochemie der Leguminosen und Fouragepflanzen. [**Biochemistry of the Leguminosae and forage plants.**] 28 × 20. pp. 115. Amsterdam : W. Junk. 1948. 28s. 6d. [Leningrad.] **1327**

Shortly before the war the late Professor Ivanov collected from twelve contemporary Russian publications a mass of information on the chemical composition under various circumstances of *Pisum, Soja, Phaseolus, Lens, Cicer arietinum, Trifolium, Medicago, Lupinus, Phleum pratense, Vicia, Melilotus* and *Sorghum.* The information comprises data assembled from all parts of the world. It is presented in 327 readily reviewed tables and is fully documented in order to facilitate reference to the original. The text is in German. Erroneous page numbers in the list of contents appear to be the only blemish in this useful reference work, which will be of value to every agricultural library.—G.M.R.

ГАРБУЗОВА, А. П. **Количественное определение алкалоидов в люпине нефелометрическим методом без специальной аппаратуры.** *Доклады Всесоюз. Акад. С.-Х. Наук* 1949. *No.* 2. стр. 33-5.

GARBUZOVA, A. P. [**Quantitative determination of alkaloids in lupin by the nephelometric method without special apparatus.**] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1949. No. 2. 33-5. [Novozybkovsk Agric. Expt. Sta.] **1328**

The method of Prjanišnikov for determining alkaloids in plants necessitates the use of a nephelometer, but the majority of laboratories have not the means of working with this apparatus, and a calorimeter in its place does not give sufficiently accurate results. The method described involves extraction of alkaloids from plant material by ether-chloroform infusions, and, after subsequent processes, comparison is made with a standard for alkaloid content.—M.H.

EVANS, R. J., and ST. JOHN, J. L. **Influence of autoclaving dry peas in some properties of the proteins.** *Cereal Chem.* **25.** 377-85. 1948. [Dept. Agric. Chem., Agric. Exp. Sta. East Lansing, Michigan (R.J.E.) and Chairman, Dir. of Chem., State Coll. Washington, Pullman (J.L. St. J.)] **1329**

The influence of autoclaving dry peas on the peptization and digestibility of the protein has been determined. Autoclaving finely ground dry Alaska peas decreased the protein dispersion by water at pH 1.8 and 10 and by a 1.0 *N* sodium chloride solution in the pH range 6 to 12. The per cent protein soluble in water and in saline solution was decreased. Mild autoclaving (110°C. for 30 minutes) increased the percentage of alkali-soluble protein, but more drastic autoclaving (130°C. for 60 minutes) again decreased it. The percentage of nitrogenous compounds peptized by different salt solutions was decreased by autoclaving the peas, particularly when drastic autoclaving was employed.

The liberation of amino groups by *in vitro* enzymic digestion of dry peas was decreased by autoclaving as was the liberation of methionine and lysine by *in vitro* trypsin and erepsin digestion. Autoclaving at 130°C. for 60 minutes caused a destruction of 24 per cent of the cystine, 25 per cent of the lysine, and none of the methionione in dry peas as determined by microbiological assay.—Authors' abstract.

WETTER, L. R., and MCCALLA, A. G. **Electrophoretic properties of pea proteins.** *Canad. J. Res.* Sect. C. **27.** 96-102. 1949. **1330**

The soluble proteins of pea meal were extracted with phosphate buffer and fractionally precipitated with ammonium sulphate. An electrophoretic analysis of each preparation was made, and the amount and mobility of each component determined. There are probably three distinct components in the pea protein and one of these at least is a protein system, which tends to separate into further components under some conditions. The components were not at all well separated by fractional precipitation, and the separation was decidedly affected by the method of preparation and the pH of the precipitation medium.—Authors' abstract.

ГЕНЕРАЛОВ, Г. Ф. Содержание белка и жира у сортов сои. *Селек. Семеновод.* 1949. *No.* 4. стр. 50-3.

GENERALOV, G. F. [**Content of protein and fat in soybean varieties.**] *Selek. Semenovod.* 1949. No 4. 50-3. [State Commissariat for Varietal Trials of Grain Crops] **1331**

Chemical analysis was carried out of seeds harvested in different years from 1938 to 1947.

Varieties grown in the Ukrainian SSR and in Transcaucasia have an increased content of protein. The varieties having the highest content of fat are those grown in the Taldy Kurgan province, in the North Caucasus and in the central part of Western Georgia. A somewhat reduced content of fat is observed in varieties grown in the Ukrainian SSR, and of protein in those grown in the Taldy Kurgan province. An increased total content of protein and fat is noted in varieties grown in the Georgian SSR. In all varieties there were observed sharp fluctuations of protein and fat depending on place of cultivation and agro-meteorological conditions of the individual years. The higher the mean daily temperature with insufficient precipitation during the growing period, the higher the content of protein and the lower the content of fat. With a reduction in the mean daily temperature with normal and increased precipitation a reduction in protein and an increase in fat are observed. In years with a sharp fall in the mean daily temperature with insufficient precipitation, particularly in the first period of development, a reduction of the total content of protein and fat is noted. On irrigated varietal plots with comparatively high mean daily temperatures and provision of regular waterings a decreased content of protein and an increased content of fat were noted.

No direct relation was found between the sum of the temperatures during the vegetative period and the content of protein and fat. This may be explained by the fact that " the sum of the temperatures " frequently does not depend on the height of the average daily temperature and even on the total precipitation during the vegetative period, since here evidently other factors influence the agro-meteorological complex (number of days with relative atmospheric moisture below 25 per cent, equality of distribution of precipitation according to the phases of development of the plants, duration of the vegetative period, etc.)

In one and the same variety no direct relation was found between the duration of the vegetative period during different years and the content of protein and fat, but it was noted that early ripening varieties have an increased content of protein and a decreased content of fat compared with medium-early ripening varieties.

No direct relation was noted between the content of protein and of fat and high yield and large size of seed. A reduction in protein corresponds with an increase in fat and *vice versa*.—R.P.J.

IOWA Agricultural Experiment Station. Res. Bull. 359. **The effect of injury simulating hail damage to soybeans.** By *R. R. Kalton* et al. 1949. pp. 60. **1332**

Annual losses to crops from hail damage in Iowa averaged over $3 million in 1923-42; the area under soybean increased from 174,000 in 1936 to 1.5 million acres in 1946. In order to help in assessing hail damage on this crop, experiments were designed in which simulated hail damage (defoliation, stem bruising, decapitation, etc.) was inflicted on replicated plots of soybean at different stages of development. The type of damage and mode of recovery of the plant is well illustrated in the report. Generally, damage inflicted when seed begins to develop in lower pods caused losses in yield of 27, 50 or 77 per cent for light, medium and heavy damage respectively. Plants of 6 to 12 in. in height with 2 to 5 trifoliate leaves unrolled were damaged least. Oil per cent of seed was decreased by heavy damage inflicted before the pods began to yellow. Stands were reduced by cutting off 25, 50 and 75 per cent of the plants at ground level and at half their height at 5 stages of growth, particularly when near the "green bean" stage. Removing 10 to 75 per cent of the leaves before blooming reduced yield only slightly.—K.J.S.

OIL CROPS

FRANCIOSA, L. Olivicoltura e piante oleaginose nella Lucania. [**Olive cultivation and oil plants in Lucania (South Italy).**] *Olearia.* **3.** 199-203. [English summary, p. 162] 1949. **1333**

Information on climate and soil of Lucania is given. Cultivation of herbaceous oil plants is hindered by climatical conditions. Flax was grown in the past, both for fibre and oil, over more than 5,000 ha., and at present over 1,000 to 2,000 ha. Cotton and *Ricinus* are occasionally grown, the latter often intercropped with a leguminous plant for grain.—E.B.

FERRARA, A. Oleaginose ed oli vegetali nel continente asiatico. [**Oleaginous plants and vegetable oils in Asia.**] *Olearia.* **3.** 184-98. [English summary, p. 162.] 1949. [Florence, Ist. Agron. Africa Italiana.] **1334**

A general review of production of oil plants, and of oil industry and trade. It is considered that Asia will no longer be in the condition to meet European demand, particularly in respect of herbaceous oil crops.—E.B.

CHOPRA, I. C., HANDA, K. L., and KAPOOR, L. D. **A preliminary note on the essential oil bearing plants growing in Kashmir. II.** *Indian J. agric. Sci.* **17.** 100-3. 1948. [Drug Res. Lab. Jammu-Tawi] **1335**

Reports are given on the following plants with aromatic properties collected in different parts of Kashmir: *Acorus calamus*, rhizomes used in medicine; *Cinnamomum tamala*, bark used for cinnamon oil which is antiseptic and carminative; *Hyssopus officinalis*, leaves used to produce a stimulant and the hyssop oil for flavouring; *Angelica glauca*, root used for spice and in medicine; *Salvia* spp., dry leaves and flowering tops were steam-distilled for the production of sage oil; *Elsholtzia cristata* and *E. densa*, dry herb distilled for medicine; *Heracleum* species, fruits and leaves used for their aromatic properties; *Artemisia* spp., different species used to produce santonine, wormwood oil and estrangon oil; *Macrotomia benthamii*, flowering shoots used medicinally; *Rhus succedanea*, fruits and leaves used for aromatic purposes; *Vitex negundo* and *Lantana camara*, dry flowering shoots used in medicine. In the case of the majority of these oil-bearing plants the properties of yield, specific gravity and refractive index of the oil is given for the local plant oil in comparison with the foreign plant oil.—M.E.E.

HANDA, K. L., KAPOOR, L. D., and CHOPRA, I. C. **A preliminary note on the essential oil-bearing plants growing in Kashmir. Part III.** *Indian J. agric. Sci.* **17.** 389-92. 1948. [Drug Res. Lab., Kashmir State] **1336**

A further collection of oil-bearing plants of possible economic use was made in the Kashmir valley. The plants studied were *Xanthoxylum alatum*, *Aegle marmelos*, *Juniperus* spp., *Ferula jaeschkeana*, *Archangelica officinalis*, *Carum carvi*, *Prangos pabularia*, *Origanum vulgare*, *Senecio jacquemontianus*, *Chaerophyllum villosum*, *Achillea millefolium*, *Eryngium caeruleum* and *Anthemis nobilis*. The properties, characteristics and uses of these plants are given in detail.—M.E.E.

FOOD AND AGRICULTURE ORGANIZATION. **Report of the F.A.O. oilseed mission for Venezuela.** Washington, 1949. pp. 83. **1337**

The Mission surveyed the wild oil bearing plants of Venezuela and made recommendations regarding future cultivation of those considered most suited to development. Aerial survey and photography were used for commuting selected stands.

The average annual commercial supply of edible fats and oils in Venezuela is estimated at 13,000 metric tons, or about 9 grains per head per day (comparable with 125 g. in U.S.A. and 124 g. in U.K.); of this total only about 8000 tons are home produced. However, the rural population probably augments its fat supply by processing nuts of the coroba palm and rendering the fat of locally slaughtered animals.

Coconut palm. The Mission estimates the total number of *Cocos nucifera* palms in Venezuela at 1,556,197 on an area of about 15,600 hectares, distributed mainly in coastal regions; this corresponds to a yearly production of about 93 million coconuts and an average annual yield of 9337 metric tons of oil or 600 kg. oil/hectare. Actual yields are nearer 395 kg. oil per hectare. In plantation practice spacing is about 10 metres after emergence. After a period in the field nursery they are planted in the field at 1 year. African oil palms normally bear 2 to 6 bunches of fruit a year, each bunch containing 1000 to 2000 individual fruits. In Malaya the estimated annual yield is 2000 kg. of palm oil and 500 kg. kernel oil per hectare. No serious pests or diseases were encountered in Venezuela.

American oil palm. Corozo oleifera should be compared with African oil palm in experimental plantings.

Wild palms. These include *Scheelea*, *Orbignya*, *Maximilliana*, etc., exist in large numbers and produce large amounts of vegetable oil, but the largest stands are inaccessible. Carefully supervised small scale exploitation might be undertaken by the Government.

Annual oilseed crops. Sesame is grown on about 2000 hectares with average yields of 700-800 kg./ha. There is little experience in the country of other oil crops. The Mission recommend that sesame production should be expanded immediately in the States of Portuguesa and Guarico. Maize planters, binders and combine threshers should be introduced for the crop. Commercial seed stocks of better varieties of sunflower, groundnuts and soybeans should be built up, and experimental comparative crop studies of these crops and sesame should be established. Long range investigations of cottons, flax, safflower, perilla and chia are recommended.

Large-scale mechanized farming must be developed if the fat deficit is to be remedied; oil crushing plant requires modernization.—K.J.S.

CROCIONI, A. Le piante oleifere in coltura intercalare e consociata. [**Oil plants grown as catch crops and intercropped.**] *Humus, Milan* **5.** No. 3. 3-5. 1949. **1338**

The principal herbaceous oil plants grown in Italy are reviewed. Colza is grown as a catch crop in the period autumn/spring, soybean and sunflower in summer/autumn. There are colza varieties adapted to spring sowing, but they have only a small diffusion because they are low yielding and easily attacked by parasites. In the Po plain colza is grown for forage or for grain (yields of 20 ql. of seed per ha. can be obtained). The cultivation takes place after wheat and is followed by a renewing crop, generally maize (sown 1-15 September and harvested the end of May to the beginning of June). In southern regions the vegetative period is shorter.—E.B.

OLIVA, M. La coltivazione del lino da olio in montagna. [**Oil flax cultivation on the mountains.**] *Ann. Ente consorz. interprov. toscano Sementi* **3.** 207-17. 1944. [Received 1948] **1339**

DANSK FRØAVL. Om Rapsdyrkning. [**Concerning the cultivation of rape**] **32.** 182-3. 1949. **1340**

The Oil Seed Committee of the Danish Seed Merchants' Association points out that in practice the seed yield of rape is considerably lower than in experiments. According to information regarding cultivation of winter rape in Sweden the average yield for 1941-48 was approximately only 16 hkg. seed per ha. The yield in Denmark is to be considered about the same as in Sweden, where cultivation is mainly located in Scania. The cultivation of rape constitutes a serious risk to swede seed production through crossing. On soils where about 16 hkg. rape seed is harvested, a yield of barley amounting to approximately 35 hkg. grain per ha. plus straw can be counted on.—R.P.J.

MANI, K. V., NIKOLAICZUK, N., and MAW, W. A. **Flaxseed mucilage and its effect on the feeding value of linseed oil meal in chick rations.** *Sci. Agric.* **29.** 86-90. 1949. [Macdonald Coll. (McGill Univ.) Quebec] **1341**

Flaxseed mucilage when incorporated into a starter ration containing 15 per cent soybean meal has a significant growth depressing effect on chicks and causes the development of beak necrosis.

In the improvement of linseed oil meal by water treatment, higher drying temperature has a greater beneficial effect.

The viscosity of aqueous solutions of flaxseed mucilage is appreciably reduced by autoclaving and by drying at 80 degrees C., and to a lesser extent by holding at room temperature for 24 hours.

It is suggested that the presence of the mucilage in linseed oil meal is one of the factors involved in its low feeding value for the chick and that the improvement in the meal as a result of higher drying temperatures in the water treatment process is partly due to alteration in physical properties, notably viscosity, of the mucilage.—Authors' summary.

MANI, K. V., NIKOLAICZUK, N., and MAW, W. A. **Cyanogenetic glucosides and trypsin inhibitors in linseed oil meal.** *Sci. Agric.* **29.** 91-5. 1949. [Macdonald Coll. (McGill Univ.) Quebec] **1342**

Data obtained on three samples of linseed oil meal indicate that increases in the yield of hydrocyanic acid liberated under incubation are not associated with corresponding decreases in the feeding value of the meals in chick rations.

The presence of raw acqueous extracts from linseed oil meal, and from flaxseed which should have contained the trypsin inhibiting factors, has little influence on the tryptic hydrolysis of casein. Autoclaved extracts likewise are without noticeable effect. These findings suggest that trypsin inhibitors are not present in these extracts to any appreciable extent.

It is concluded that the observed toxic effect of linseed oil meal in chick rations is due primarily to factors other than cyanogenetic glucosides and trypsin inhibitors.—Authors' summary.

МОМОТ, Я. Г. Лен масличный Бухарский 32. *Селек. Семеновод.* 1949. *No.* 1. стр. 49-51.

MOMOT, Ja. G. [**Oil flax Bukhara 32**] *Selek. Semenovod.* 1949. No. 1. 49-51. [Miljutinsk State Breed. Sta.] **1343**

Linum usitatissimum ssp. *eurasiaticum* occurs in different forms, and the above variety is the first of the bushy type to be released by the Miljutinsk Station for unirrigated areas in Uzbekistan. It has been produced from a local population originating in the mountains of Bukhara, and is of the oil-producing rather than fibre-producing type. It has high resistance to drought and at the same time it gives high seed yield in Northern Caucasia, where moisture is adequate, exceeding the standard type VIR 1650 in this respect. In irrigated localities other varieties should be used.

The husk content is somewhat high (44.4 per cent), preference from this aspect being given to the variety VNIIMK Safedak (No. 5288), which has a husk content of 36.0 per cent.—M.H.

HEISER, C. B. Jr. **Hybridization between the sunflower species** ***Helianthus annuus*** **and** ***H. petiolaris.*** *Evolution* **1.** 249-62. 1947. [Dept. Bot., Indiana Univ. Bloomington, Indiana] **1344**

The sunflower species *Helianthus annuus* and *H. petiolaris* are widespread weeds in North America. Most botanists have held that the two species are indigenous to the Great Plains region. Although the two species are now sympatric in their distribution, they may have been allopatric at one time. There are slight differences in ecological preference and in time of blooming between the two species.

Hybrid swarms between the two species have been found in Arizona, Illinois, and Missouri. Two of these hybrid swarms are analysed on the basis of pollen and seed fertility and the variability of the disk diameter. Comparison of the artificial with the putative natural hybrids tends to verify that the latter are truly of hybrid origin.

It is suggested that introgression has been of importance in the development of superior genotypes which may have increased the ability of the two species to spread as weeds.—From Author's summary.

BJÖRKLUND, C. M. Hur skall rapsen skördas? Med självbindare eller skördetröska? [**How should rape be harvested? With the self-binder or combine?**] *Lantm. Svenskt Land* **33.** 514-5. 1949. **1345**

Preliminary trials show that combining of both autumn and spring rape should be carried out more extensively. Care should be taken to ensure that the crop is harvested at the right time: it should be well ripened but should not be left standing so long that serious shedding occurs. Experience indicates that the crop can tolerate a slight amount of shedding and still yield better than if cutting takes place too early.—R.P.J.

ANDRÉ, E., and KOGANE-CHARLES, M. Sur les composés sulfurés volatils préformés contenus dans les graines de diverses crucifères et dans les huiles qu'on en retire. [**Volatile compounds of sulphur contained in the seeds of several crucifers and in the extracted oil.**] *Ann. Agron., Paris* **18.** 462-70. 1948. [Lab. "Crops gras Agriculture," I.N.A., Paris] **1346**

A method has been established for estimating small quantities of sulphur combined as volatile organic compounds in the oils and seeds and cake residue after extraction of oil of crucifers. The method has been used more particularly for colza, but has also been applied to turnip (in which these compounds are present only in small quantities), camelina (present in large quantities) and black mustard which appears not to have this type of sulphur compound. See also *Fld Crop Abstr.* 1. Abs. 561.—D.B.

Keith-Kennedy, W., and Unrau, J. **A rapid method for determining the oil content of safflower and sunflower seeds.** *Agron. J.* **41.** 93-5. 1949. **1347**

The usual soxhlet method of extracting oil from seeds is tedious and takes from four to twenty-four hours. A method is described using the Waring blendor and it was found to be more rapid than the soxhlet method while the values obtained by the two methods for oil content of 7 varieties of sunflower and twelve varieties of safflower seeds were not significantly different.—T.D.H.

Nottingham University, School of Agriculture. Department of Agricultural Economics. **Linseed costs investigation 1948.** (Interim report). 1949. pp. 9. [Mimeographed] **1348**

The home-grown linseed crop has an important part to play in the Agricultural Expansion Programme not only for its fibre but for the oil so urgently needed for industrial use and for the provision of protein feed for live stock. In consequence, the acreage target aimed at in 1951 is to be eighty times as large as that for 1939. These farm studies have revealed the necessity for continued research into production methods if this object is to be attained.

It was, for instance, found that the varieties commonly used, " Royal " and " Redwing ", revealed, under the vagaries of climatic conditions, weakness which called for investigation into the possible modification of their characteristic growth, for in some areas the straw was too short for cutting by binder, in others it was too long to stand. Yields, too, tended to be poor unless the weather was sunny.

Type of soil seems to bear little relationship to the productive capacity of the seed, except that cold, heavy soils did not suit the crop. Amongst the farmers, there seems no uniform opinion as to the effect of the crop on the land. Most farmers applied artificial fertilizers, though since Blackman found that it had a negligible effect on yields, even on the poorest soils, this may be an uneconomic proportion, and require further investigation. The average seed rate per acre was seventy-nine pounds, and experience indicated that it was best not to bury the seed too deeply, nor to cross drill. More information is needed on the optimum rate for different soils and conditions.

Various methods were used for harvesting, which proved a difficult operation, and needs further consideration. Power binders seemed most successful. Threshing, though easy, was found to be tedious. As dry a day as possible was advisable for this operation.

Difficulty was encountered in finding use for the straw, but, in most cases the chaff was retained for stock on the farm. The seed was either retained for feed, or exchanged for an allowance of linseed cake.

The costs illustrate the great diversity in methods and conditions. The high cost on some farms was the result of cleaning operations, or of the application of farm-yard manure. There is clearly considerable scope for reducing harvesting costs, if the crop is to be an economic proposition, particularly in an unfavourable year like 1948. It seems also desirable to give the threshing contractors some guidance as to the best setting of their machines. Once these difficulties are overcome, there are many advantages to be derived from growing this crop.—A.D.H.

Clydesdale, C. S., and Hart, J. **Sunflowers for seed on the Darling Downs.** *Qd agric. J.* **67.** 318-31. 1948. **1349**

" The fixed ceiling price of £32 per ton for graded seed was waived during the 1947-48 season and market values rose sharply to as high as £46 per ton. At these prices the crop is a remunerative one and while they remain at or near the present level, increased acreages can be expected in Queensland." For the benefit of the Queensland farmer the author gives information on soil and climatic requirements, seed-bed preparation and crop cultivation, planting, varieties, hand and mechanical harvesting and some brief account of the more common diseases and pests.—P.M.

Jacobsen, G. Ogräsbekämpning i oljeväxter. [**Weed control in oil plant crops.**] *Svensk Frötidn* **18.** 111-3. 1949. **1350**

The control of weeds in oil plant crops sown in widely spaced drills such as autumn rape and " rybs " (*Brassica rapa oleifera*) spring rape and " rybs ", white mustard and poppy, in general causes no great trouble, but with crops sown with ordinary drill spacing, such as flax, the case is different. In addition flax frequently occupies an unfavourable place in the rotation.

Spraying with hormone derivatives cannot be carried out in rape and " rybs ", white mustard and poppy, but is effective with oil flax provided it takes place at the right time. What is reported below regarding spraying with hormone derivatives applies only to oil flax.

Of the 4K—2 M (methoxon) derivatives available on the market Agronon J and P46 are the only ones which have been tested in Sweden.

In spraying, the composition of the weed flora plays a decisive part. For control of the susceptible annual and biennial weeds *Thlaspi arvense*, *Brassica campestris*, *Sinapis arvensis*, *Raphanus raphanistrum*, and also the perennials *Plantago major*, *Barbarea vulgaris* and *Cirsium* *arvense*, spraying with 5 litres per ha. of one of the 4K—2M preparations, for example Agroxon J or P46, gives good results. In the case of *Cirsium arvense* spraying is most effective in a later stage than of the other weeds mentioned.

To combat moderately susceptible weeds such as *Centaurea cyanus*, *Galeopsis*, *Capsella bursa pastoris*, *Polygonum tomentosum*, *P. convolvulus*, *Spergula arvensis*, and also *Sonchus arvensis* and *Tussilago farfara* spraying must take place early, that is, in the 2nd to 4th leaf stage with a slightly larger amount of 4K—2M or 7 to 8 litres per ha.

The flax should be sprayed when the plants have attained a height of about 5 cm. Where such weeds as *Cirsium arvense* are to be combated spraying should be carried out at a slightly later stage or when the flax is 10 to 20 cm. high. Experience indicates that with the lowest dosing, 5 litres per ha., spraying can without great risk take place early as well as when the plants are 10 to 12 cm. high. When moderately susceptible weeds predominate and when one must therefore use the higher dosing, 7 to 8 litres per ha., spraying should not be carried out too late. Flax should not be sprayed later than when the plants have reached a height of 20 cm. The temperature should be about +10 degrees. Spraying should not be carried out if there is a risk of frost.—R.P.J.

PAATELA, J. **Artificial hormones and weed control in oil flax cultivations.** 1949. pp. 52. **1351**

The results of field experiments and investigations with artificial hormones conducted by the Department of Agronomy of the Central Agricultural Experiment Station, Tikkurila, Finland, are reported.

In southern Finland and in areas with similar climatic conditions artificial hormones appear to be of considerable importance in the control of weeds in oil flax cultivations. The best results are obtained by applying 1 kg. of 2 M-4K per ha. at an early stage of development (when the plants have attained a height of from 3 to 13 cm.).—R.P.J.

WAHLIN, B. Parasiter på oljelin. [**Parasites on linseed.**] *Lantm. Svenskt Land* **33.** 320-1. 1949. **1352**

Recently linseed in Östergotland has suffered serious injury owing to attack by *Aphthona euphorbiae.* The insect can be controlled by dusting or spraying (preferably dusting) with DDT preparations. In the summer of 1948 a number of attacks of a fungoid disease caused by *Alternaria linicola* were determined in Sweden; the fungus had not previously been recorded in the country, but was known to occur in Denmark. According to Danish investigations *A. linicola* occurs mainly in connexion with deficiency diseases of linseed, particularly manganese deficiency.—R.P.J.

SMITH, A. K., and JOHNSEN, V. L. **Sunflower seed protein.** *Cereal Chem.* **25.** 399-406. 1948. **1353**

The isolation of sunflower seed protein has been investigated to determine its probable value for industrial uses. The principal method of protein isolation was by alkali extraction and acid precipitation, and the protein isolated by this method was compared in colour and yield with that obtained by salt extraction. The chlorogenic acid in the meal retarded the dispersion of the protein. Due to the presence of chlorogenic acid, the added alkali imparted a green color to the meal and to the isolated protein. Hot 70 per cent ethanol or near absolute methanol were used to remove the chlorogenic acid, but they severely denatured the protein. The alkali-extracted protein had a nitrogen value of about 16.4 per cent and protein prepared from methanol-extracted meal followed by salt extraction and dialysis had a nitrogen value of 18.69 per cent.—Authors' abstract.

КОРНИЛОВ, А. А. Цветение периллы при непрерывном освещении. *Доклады Акад. Наук СССР* Том 64. *No.* 3. стр. 401-3. 1949.

KORNILOV, A. A. [**Flowering of *Perilla* in continuous light.**] *Doklady Akad. Nauk SSSR* **64.** 401-3. 1949. [Karagandinsk Agric. Expt. Sta., Dolinsk] **1354**

Perilla ocymoides, a short-day plant, flowers and fruits in a 4 to 16-hour day. During 1946-7 abundant flowering was obtained with continuous light during 5 to 7 months of vegetation. In contrast to seed of millet, which germinates equally well in light or darkness, *Perilla* seedlings in continuous light develop slowly and unevenly. For these tests seed was taken from good specimens and planted in soil so that the first leaves remained in light above ground. The subsequent plants grown in short day and in uninterrupted light had a different construction; excessive shortening of the day greatly depressed growth of stems and stunted, thick-set plants were formed. Uninterrupted light produced vigorous growth with numerous branches and abundant leaves.

The data include effect on plant growth of five fertilizer variants, and it is maintained that when vegetative growth is suspended in uninterrupted light, the cause is the gradual deterioration of mineral nutrients and limitation in water supply. Development of short-day plants maintained in unsuitable photoperiods (long day or uninterrupted light) proceeds with extreme slowness.—M.H.

SEN, N. K., and PAIN, S. K. **Photoperiodic effect on *Sesamum* in relation to the variations of the environmental factors of the different seasons.** *Proc. Nat. Inst. Sci. India* **14.** 407-20. 1948. **1355**

Two varieties of Indian Sesamum I.P. 29 (late) and I.P. 7 (early) were grown in pots in four seasons, winter (January), summer (April), monsoon (July) and autumn (October). In all the sowings different sets were exposed to short photoperiod of 10 hrs., long photoperiod of 14 hrs. and in natural photoperiod of the season which varied between 10 hrs. 47 mins. to 13 hrs. 30 mins.

In all the sowings I.P. 29 had greater vegetative growth flowering later than I.P. 7 and the effect on growth and development due to variation in climatic conditions and different photoperiods was more pronounced in the former. I.P. 7 is more susceptible to pests and in monsoon the majority of the plants were killed.

In all the sowings short photoperiod induced early flowering and long photoperiod delayed it. The effects were greatly influenced by season, photoperiod and the variety of the Sesamum.

Exposed to short photoperiod of 10 hrs. the vegetative period of both types was almost similar, being about 25 days except in winter when it was about double that period.

In I.P. 29 flowering was much delayed in summer and monsoon, both in normal and long photoperiods as compared to autumn and winter sowings.

Plants in short photoperiod grew less and in long photoperiod more in height than those of the control set. The growth rate, however, varied with the season and the variety.

Number of nodes varied with height of the plants. The formation of nodes with one leaf was closely associated with the onset of reproductive phase.

The form of the leaves and their size were greatly affected due to sowing time and photoperiod. Long photoperiod induced leaf heteromorphism—the proportion of different types of leaves being directly influenced by length of the photoperiod.—Authors' summary.

FIBRE CROPS

Food and Agriculture Organization. Comm. Ser. No. 9. **World fibres review 1948.** Washington. pp. 72. 1948. **1356**

Panse, V. G. **Cotton in Egypt.** *Indian Cott. Grow. Rev.* **3.** 1-18. 1949. [Inst. of Plant Industry, Indore] **1357**

Observations on Egyptian cotton were made during April 1948 and are here summarized together with statistical and other data relating to cotton growing. Throughout the report attention is drawn to the possibilities of putting superior Egyptian cultivation practices and technique to the test under Indian conditions. One of the outstanding features of the industry in Egypt is the evolution and successful maintenance of a system for ensuring an absolute varietal purity of Egyptian cotton which consequently ranks high in prestige value among world cotton spinners. Similar prevention of varietal mixing is strongly urged for Indian cottons. Only approved varieties of cotton may be grown in Egypt although in each area many different varieties may be chosen. Spinning services have been developed and the average yield has been raised to over 500 lb. of lint per acre by research which is centralized under one authority, namely the Cotton Research Board. There is a discussion of the Indian cotton-growing policy and management in relation to the Egyptian example, and the need for longer-staple, more-productive cottons in India is very urgent.—M.E.E.

Cappelletti, F., and Cerrina Feroni, F. Rel. No. 63. La cotonicoltura nel Congo Belga (Relazione di una missione di studio compiuta nel 1938-39). [**Cotton cultivation in Belgian Congo.** (**Report of Mission of study during 1938-39**).] 24 × 17. pp. 166. Firenze: Istituto Agronomico per l'Africa Italiana. 1940. [Received 1948] **1358**

Khoorsid, A. B. H. **The cotton crop in Hyderabad State.** *Indian Cott. Grow. Rev.* **3.** 27-39. 1949. [Dept. Agric., Hyderabad State] **1359**

About 10 per cent of the total output and 15 per cent of the total acreage of Indian cotton is found within this State. Noticeable in the past 20 years has been the foolish mixture of the better original varieties with poor short staple types so that the present commercial crop is far from pure. Climate and soils of the various tracts are described as well as the cultural operations, irrigation and harvesting, pests and diseases of the cotton crop. Detailed statistics of areas and production are given and the method of selling unginned cotton and cotton seed is discussed. Some improved varieties have been produced for specific areas and arrangements have been made for the supply of pure seed of these improved types to the cultivators.—M.E.E.

Gadkari, P. D., and Simlote, K. M. **Cotton cultivation in Central India and Rajputana. I. Cotton tracts and the crop.** *Indian Cott. Grow. Rev.* **3.** 19-26. 1949. [Inst. of Plant Industry, Indore] **1360**

Agricultural and climatological characters of the four main cotton-growing tracts are described. In these regions six types of cotton are cultivated and details regarding their origin, history, present botanical composition, technological characters and cultivation are given in turn. The types include Cambodia or upland cotton belonging to *Gossypium hirsutum* and several mixed varieties of *G. arboreum* var. *neglectum* f. *bengalensis* and *G. arboreum* var. *neglectum* f. *indica*.—M.E.E.

COOK, L. J. **Experiments on flax growing—in South Australia, 1941-47.** *J. Dep. Agric. S. Aust.* **52.** 222-4. 1948. **1361**

During the first two seasons, the two varieties Concurrent and Lival Crown were compared and in 1943 Lival Prince was added to the test; in 1945 Norfolk Earl was included. Performance varied in the different districts, but indicated that the thicker stemmed and later-maturing Concurrent is more suited to the cooler and wet districts of the South-East and Southern areas and the early maturing finer-strawed varieties, Lival Prince and Lival Crown do better under Central and Northern conditions.

Trials were conducted to compare sowing in drill rows with seed sowing by spreading. On the average the latter gave the heavier yield.—P.M.

TOIT, J. J. du **The production and uses of sunn-hemp.** *Fmg S. Afr.* **23.** 819-22. 1948. [Coll. Agric., Potchefstroom] **1362**

The main uses and characteristics of *Crotalaria juncea* are summarized. It is grown chiefly as a green-manure crop although the feeding value of sunn-hemp hay compares fairly favourably with that of cowpeas and lucerne. Its use as a fibre crop in India has encouraged experiments in Rhodesia which have been promising. Climatic, soil, and fertilizer requirements of the crop are discussed, and instructions are given for correct time of sowing and method of harvesting. Time of cutting must be adjusted according to the use made of the plant; for hay and silage purposes the plant must be cut at an early stage but the crop is best ploughed under for green manure when in the late flowering and full green-pod stage.—M.E.E.

SINHA, A. C. **Jute cultivation in Bihar.** *Indian Fmg* **9.** 413-7. 1948. [Purnea, Bihar] **1363**

With the increased demand for food crop acreage the area given over to *Corchorus* sp. must be limited to its present extent, and yet the demand for jute products continues to increase. The only way of increasing production at the Indian mills is to produce more raw jute per unit of land or to import raw jute into the country. Obviously increased productivity is the most economic method and this can be achieved by using improved seeds and better methods of cultivation.

In the Purnea District of Bihar which is the chief jute growing area the two most common species are *Corchorus capsularis* and *C. olitorius*. Characteristics of these species and the introduction of other types are described. The crop is grown during the hot rainy season on mainly alluvial soils which may receive ashes as manure, but as a general rule little or no fertilizer is applied since the leaves of the jute crop make a valuable manure for any succeeding crop. Preparation of the land varies according to the upland or lowland situation and the rotation followed varies with the jute species. Sowing methods and seed rates are given and emphasis is laid on the importance of inter-cultivation. The harvesting, retting and washing processes are described in detail and illustrated, and costs of production are related to marketing and yield, and are compared with similar data for rice and maize. Net profit of jute is higher than that of the other crops and this is particularly true of *C. olitorius* sp. under farm conditions as opposed to cultivators' conditions.—M.E.E.

TIDSSKRIFT FÖR PLANTEAVL. Forsøg med forskellig Rusketid for Spindhør 1940-1946. [**Experiments with different pulling dates of fibre-flax (in Denmark) 1940-1946.**] *Tidsskr. Planteavl* **52.** 365-7. 1949. **1364**

The experiments were conducted at the State Experiment Stations (on loamy soil at Lyngby, Aarslev and Blangsted, and on marshy soil at Ribe) with Stormont Cirris fibre flax. Six pulling dates were compared. The first pulling was carried out when most of the seed capsules had become greenish yellow and the seeds were green with yellow tips, and subsequently at weekly intervals. On loamy soil the pulling dates were 18th and 25th July, and 1st, 8th, 15th and 22nd August. On marshy soil pulling took place slightly later.

The results of the experiments varied slightly from year to year and from place to place. On marshy soil the yield of fibre was low and the results were somewhat uncertain. The average results of the experiments on loamy soil are shown by the following statement:

	1st	2nd	3rd	4th	5th	6th
	Pulling date					
	kg. per ha.		kg. per ha.		Value figure per ha.	
Seed	5.4	7.3	8.1	8.0	7.3	6.2
Straw	48.0	49.3	49.4	49.2	49.2	49.0
Scutching flax	608	650	622	581	556	444
Scutching tow	1077	1062	1086	1140	1184	1263
Scutching flax	28.7	30.6	29.8	27.8	26.7	21.6
Scutching tow	9.5	8.8	9.7	10.1	11.2	12.5
Scutching flax + Scutching tow	38.2	39.4	39.5	37.9	37.9	34.1

The seed yield rises up to the 3rd pulling date, after which it declines owing to shedding. The yield of straw is slightly less at the 1st than at the other pulling dates, which give about the same straw yield. The largest yield of scutching flax was attained at the 2nd pulling date and the yield declines markedly with shifting of the pulling date, so that the 6th pulling date gives about only two-thirds of the 2nd and the 1st pulling date gives approximately 40 kg. scutching flax less than the 2nd pulling date. The sequence in yield of scutching tow is the exact reverse of scutching flax, as it is lowest at the 2nd, and highest at the 6th pulling date. In joint value figures the 2nd and 3rd pulling dates are highest and identical, while the 1st, 4th and 5th pulling dates lie 3 to 4 per cent and the 6th pulling date 14 per cent lower. If the values of fibre yield and seed yield are added together, the 3rd pulling date gives the best result.

These results indicate that fibre flax for green scutching should be pulled in the stage of development which corresponds to the 3rd pulling date or slightly earlier, that is as a rule when the majority of the capsules are brownish, the seeds in the middle capsules are slightly brownish, the stems have begun to assume a yellow colour and have lost their leaves on the lowest third or half.—R.P.J.

ТЮКАВКИН, П. М. и СИВЕРИН, В. В. К вопросу об использовании пласта многолетних трав. *Доклады Всесоюз. Акад. С.-Х. Наук* 1949. *No.* 2. стр. 15-6.

Tjukavkin, P. M., and Siverin, V. V. [**Use of perennial herbage sowings.**] *Doklady Vsesojuz. Akad. S.-H. Nauk* 1949. No. 2. 15-6. [Tarskaja Agric. Expt. Sta.] **1365**

In the collective farms in the sub-taïga zone of Western Siberia the use of 2 or 3 year courses of clover/timothy sowings is being developed. At the above Station study is made of the effect of date of ploughing the clover/grass sowing on subsequent yield of straw and seed of flax in which comparison of October with July shows the advantage of the later date.—M.H.

РАКИТИН, Ю. В., ОВЧАРОВ, К. Е. и НИЗКОВСКАЯ, Е. К. Формативные изменения у хлопчатника под влиянием 2,4-дихлорфеноксиуксусной кислоты. *Доклады Акад. Наук СССР*. Том 60. *No.* 6. стр. 1073-5. 1948.

Rakitin, Ju. V., Ovčarov, K. E., and Nizkovskaja, E. K. [**Formative changes in cotton under the influence of 2,4-dichlorophenoxyacetic acid.**] *Doklady Akad. Nauk SSSR* **60.** 1073-5. 1948. [Timirjazev Inst. Pl. Physiol., Acad. Sci. USSR] **1366**

The use of 2,4-D for purposes of improving yields is advocated. Tests made in the Stalinabad Province, Tadžik SSR, show that changes can be induced in leaves and stems of cotton by treatment in certain concentrations of the substance.—M.H.

ВСЕВОЛОЖСКАЯ, Г. К. Влияние альфа-нафтилуксусной кислоты и других стимуляторов роста на урожай семян конопли. *Доклады Акад. Наук СССР*. Том 65. *No.* 2. стр. 233-5. 1949.

Vsevoložckaja, G. K. [**The effect of alpha-naphthylacetic acid and other stimulants of growth on yield of flax seed.**] *Doklady Akad. Nauk SSSR* **65.** 233-5. 1949. [All-Union Sci. Res. Inst. for Fibre Crops, Gluhov, Sumsk Province] **1367**

The following percentage seed yields were obtained in studying the effect on flax of the various substances :

Substance	Percentage Concentration	With one treatment	With two treatments
Control	—	100	—
Alphanaphthylacetic acid	0.001	155	143
	0.005	132	128
	0.01	119	113
Heteroauxin	0.001	123	111
	0.005	118	115
	0.01	123	109
2,4-dichlorophenoxyacetic acid	0.0005	139	106
	0.001	81	85
	0.005	75	48
2,4-dichlorophenoxyoleific acid	0.0005	94	89
	0.001	102	88
	0.005	103	87

—M.H.

Opitz, K. Über die Möglichkeit der Steigerung der Leinerträge durch Stickstoffdüngung ohne Qualitätsbeeinträchtigung. [**The possibility of increased flax production by nitrogen manuring without detriment to quality.**] *Pflanzenbau* **20.** 109-16. 1944. [Univ. Berlin] [Received 1949.] **1368**

Texas Agricultural Experiment Station. Bull. 704. **Mechanized production of cotton in Texas.** By *H. P. Smith* and *D. L. Jones*. 1948. pp. 62. **1369**

A summary of present methods of cotton production in Texas, dealing with the disposal of previous crop residue, preparation of seed-bed, planting, fertilizer application, thinning and spacing, cultivation, insecticides, defoliation and harvesting with particular reference to the various machines used in these operations.—G.M.W.

Roberty, G. Variation de longueur dans les poils d'une même graine de coton. [**Variation in the length of the hairs in a single cotton seed.**] *Cot. Fib. trop.* **4.** 25-32. 1949. **1370**

Various methods have been used to estimate the length of hair in cotton seeds. Results not being satisfactory, the more simple methods are preferred by the author. Cotton seeds are picked at random, the hairs combed and a small tuft detached at about 45° from the top of the seed. The average length is measured for 100 seeds of each strain so that a percentage is obtained, although not an absolutely accurate one. A long, illustrated explanation is given of a calculation of the most probable average length.—O.L.

Ahmad, N., and Iyengar, R. L. N. **A new method for the determination of the average diameter of textile fibres, filaments, fine wires, etc.** *Indian J. agric. Sci.* **17.** 104-13. 1948. [Technological Labs., Bombay] **1371**

The apparatus depends upon intercepting a uniform beam of light directed on a photoelectric cell with a parallel bundle of cotton or other fibres so that the photoelectric current is reduced. By the simple formula $d = \frac{l}{n} \cdot \frac{I_1 - I_2}{I_1}$ where n is the number of fibres counted under a low-power microscope, I_1 is the original current, I_2 is the reduced current and l is the length of slit through which the beam passes, the average diameter d of the fibres can very quickly be determined. A special slide has been made for mounting the fibres quickly with no overlapping and dyes can be used to render transparent fibres opaque. Values found by this method do not differ significantly from those obtained by microscopic examination and this new method gives accurate results and is at the same time quick enough for routine testing of a large number of samples.—M.E.E.

Nagabhushana, S. **Variations in the properties of the cotton fibre in relation to its position on the surface of the seed. II.** *Indian J. agric. Sci.* **17.** 305-39. 1948. [Silver Jubilee Tech. Inst., Bangalore] **1372**

The present tests deal with the properties of rigidity, ribbon width and convolutions per inch as the fibre properties regarding length, weight and strength have already been investigated by the workers in the same field. Standard Indian *Gossypium* spp. were used and in all cases sample fibres from the apex and the base were tested. Higher fibre rigidity was found in fibres from the apical region of the cotton seed than in those from the basal region. Ribbon width remained fairly constant in fibres from all parts of the seed although some significant differences were obtained. The difference in the number of convolutions per mm. between fibres from the apical and basal regions varied from 14.1 per cent to 43.3 per cent in the different cotton varieties. These variations in fibre properties are attributed in part to the time lag in the differentiation of neighbouring epidermal cells into lint hairs and to other factors of lint growth.—M.E.E.

Ionită, M. Rezistenta şi elasticitata fibrelor unicelulare la in faţă de grosimea tulpinilor. [**Resistance and elasticity of the unicellular fibres of *Linum usitatissimum* compared with the thickness of stems.**] *Anal. Fac. Agron. Cluj.* **12.** 179-84. [French summary p. 184.] 1949. **1373**

With a view to determining the variation of dynamic characters of unicellular fibres of tow in comparison with the size of stalks, an average sample of stalks of the Ilgunellis variety was studied, and sorted into the three categories thick, medium and thin. In each group, the diameter of 100 stalks picked at random was measured with a special micrometer in the middle of the length. Conclusions reached were: (1) narrow definite correlation between the thickness of the stem and the resistance of unicellular fibres. (2) Slight correlation of no practical importance between the thickness of stem and elasticity of the fibres. (3) Slight correlation of no practical importance between the strength and elasticity of the same fibres. When the dynamic character of the fibre is studied for new kinds of tow obtained by crossing or natural selection, stalks of the same thickness of all the kinds must be used. [From French summary.]—O.L.

Watkins, J. M., and Allwood, E. **Retting of kenaf, *Hibiscus cannabinus* L.** *J. Amer. Soc. Agron.* **40.** 997-1004. 1948. **1374**

Laboratory experiments indicated that retting proceeds satisfactorily at pH 6-8 and at a temperature of 34°C. Fermentation is aided by any measures that soften the tissue (maceration or stripping off the ribbons). In the field, crushed stems and bark ribbons retted in 42 hours, using the water of Lake Coatepeque, El Salvador. Tank retting gave cleaner fibre than stack retting.—K.J.S.

Mallamaire, A. Note sur quelques insectes parasites et sur quelques maladies des plantes cultivées dans les terres irrigueés de l'office du Niger. [**Remarks on some parasitic insects and diseases of cultivated plants in the irrigated areas of the French Sudan.**] *Cot. Fib. trop.* **4.** 19-24. 1949. **1375**

Cotton pest (*Sphenoreptera gossypii*), a collar and tap-root parasite is very common in the French Sudan, even in newly cultivated areas. Control methods are (1) burn all infected cotton plants. (2) Single out the plants most likely to harbour the insect and destroy them (especially the annual seed-beds). (3) Avoid cultivating perennial cotton plants: although it is to be noted that plots the longest under cultivation are the least attacked. (4) In crop rotation avoid preceding the cotton break by the *Vigna* break.

The method advocated against most leaf parasites, e.g. Thripidae, Thysanoptera, is complete eradication before cultivation of all plants susceptible to harbouring the insect, e.g. Cucurbitaceae.—O.L.

MILLIKAN, C. R. **Lower leaf scorch of flax.** *J. Dep. Agric. Vict.* **46.** 511-6 and 566-76. **47.** 37-40. 1948. **1376**

Lower leaf scorch has occurred in the State in flax grown on highly acid soils (pH 4-5 to 5-2). Areas concerned have been either virgin ground or ground which had been under ley for many years before sowing to flax. The symptons of the disease are described. In pot and field experiments the disease was found to be aggravated by the application to the soil of either manganese sulphate, sulphur or zinc sulphate or by steam sterilization. Sodium molybdate, ammonium molybdate and lime markedly reduce the percentages of flax plants affected with the disease. The observed effect of superphosphate in reducing the severity of the disease in natural soil was probably due to the presence of a significant amount of molybdenum impurity. However, when applied in conjunction with high levels of manganese application, superphosphate significantly increased the severity of lower leaf scorch. Small applications of ammonium molybdate reduced the toxic effects in flax plants resulting from heavy dressings of manganese sulphate to highly acid soils. Flax was found to be much more sensitive than oats to an excess of manganese in the substrate. It was possible to correlate changes in the incidence of the disease directly with the effects of the treatment on the manganese concentration of the plant, but not with the zinc concentrations except in the cases where zinc sulphate had been applied to the soil.

In field experiments plants treated with sulphur plus superphosphate were much more susceptible to frost injury than were those of any other treatment.

Analyses of both plants and samples collected in the field revealed that the most striking feature of the disease was its association with an increase in the manganese concentration, which increase was proportionally much greater than the increase recorded for certain other ash constituents. The manganese molybdenum value was lower in healthy plants than in diseased plants.

It is concluded that lower leaf scorch is due to the combined effects of manganese toxicity and molybdenum deficiency in the affected plants, induced by highly acid soil conditions. The existence of a manganese-molybdenum antagonism in the plant is confirmed.—From author's summary.

NEELAKANTAN, L., and BALASUBRAHMANYAN, R. **A cleistogamous mutant in cotton.** *Indian Cott. Grow. Rev.* **3.** 69. 1949. [Dept. of Agric. Madras] **1377**

The plant was observed on June 14th, 1948, in the second generation of a *Gossypium hirsutum* × *G. barbadense* hybrid, and during the following 3 weeks a total of sixty flowers was examined. Pollen was abundant and fertilization perfectly normal. The genetics of the new mutant are being worked out since the possible use of cleistogamy for easy identification and maintenance of purity is most interesting.—M.E.E.

BARRY, J. P. Effet des herbicides à base "d'hormones" sur le lin. [**Effect of herbicides of the hormone class on flax.**] *Ann. Agron., Paris* **18.** 484-7. 1948. [Bot. Lab., Nat. School of Agriculture, Montpellier] **1378**

Flax (var. "de Hongrie") is very sensitive to 2 methyl 4 chlorophenoxyacetic acid. The characteristic modifications are twisting of the stem, downward curvature of the stem tip and epinasty. Sectioning of material showed abnormal differentiation in the sub-epidermal collenchyma (as in *Vicia* and *Urtica*) and a modification in the fibres.

The use of hormonal herbicides at concentrations between 0.05 and 0.60 per cent is not recommended for flax cultivation because the crop is grown for seed and for fibre and the plant is extremely sensitive.—D.B.

ЕНИЛЕЕВ, Х. Х. Скорость набухания семян хлопчатника и температурный режим их прорастания. *Доклады Акад. Наук СССР.* Том 60. *No.* 6. стр. 1069-71. 1948.

ENILEEV, H. H. [**Rate of swelling of cotton seed and temperature regime of germination.**] *Doklady Akad. Nauk SSSR* **60.** 1069-71. 1948. [Bot. and Zool. Inst., Acad. Sci., Uz.SSR, Taškent] **1379**

It has been maintained that between individual forms and varieties of cotton there is a difference in the temperature regime of germinating seed. The author has studied the rate of swelling in relation to germination capacity under comparatively low temperatures. Seed was soaked in water at different temperatures and after 6, 10, 24 and 36 hours of soaking, fifteen specimens (from each set) were taken for analysis of water content. In one of the sets the seed comprised different forms, namely, Egyptian 2850 and 123-F, Upland 1306 and C-460, and Giza 7059. In an earlier test these forms when germinating reacted differently to temperature. The Egyptian varieties, for example, began germination at a lower temperature than did the Upland and Giza forms. The earlier tests indicated that capacity to germinate at a lower temperature is related to a quicker rate of imbibing water, and this is confirmed in the present experiments with two Upland varieties, 133-F and 3736.

The author has succeeded in establishing, further, the fact that the temperature regime of germination is related to length of storage after harvesting. The Upland variety C-460 when harvested in 1946 had less energy of germination and seedling growth than had seed stored from the 1944-5 harvests. An attempt was made in this series of trials to determine if there is a variation in seed of different years of reproduction in regard to their rate of swelling when soaked at different temperatures. Samples of the variety C-460 from 1945 and 1946 harvests were studied and the facts show that before soaking, in an air-dry condition, the seeds contained a uniform amount of water (9-10 per cent). After soaking in water at 7-8° and 13-14° the seed from the 1946 harvest in the first 6 hours absorbed more water than seed from the 1945 harvest, but in the subsequent period, soaking at the same temperatures and in all periods of soaking at 25°, the seed from the 1945 harvest showed a greater rate of swelling.

Thus it is concluded that cotton seed with great capacity to absorb moisture from the surrounding medium, possesses increased energy of germination under comparatively low temperature. The cause of this interdependence is attributed to the nature of the colloid complex.—M.H.

CRESCINI, F. Forme di canapa ("*Cannabis sativa*" L.) III. La germinabilità. [**Hemp strains** "*Cannabis sativa*" **L.). III. Germinability.**] *Nuovo G. bot. ital.* **50.** pp. 23. 1943. [Received 1949] **1380**

CRESCINI, F. Sulla germinabilità della canapa di Carmagnola. [**On germinability of the hemp of Carmagnola.**] *Ann. Accad. Agric. Torino* **87.** pp. 78. 1944. [Received 1949] **1381**

SUGAR BEET

RAYNS, F., and CULPIN, S. **Rotation experiments on straw disposal at the Norfolk Agricultural Station.** *J. R. agric. Soc.* **109.** 128-39. 1948. [Norfolk Agric. Sta., Sprowston, Norwich] **1382**

The trials have compared the yields produced on a four-course rotation by ploughing in dung, straw, and sugar-beet tops and by sheep folding beet tops and the one-year ley. Taking the whole rotation, dung has given the highest yields. Straw and sulphate of ammonia have been nearly equal to dung for cereal crops but much inferior for sugar beet.

Judged by production of starch equivalent, dung alone has on average produced 10 per cent more than the combination of straw and sulphate of ammonia with sheep folding of beet tops and one-year ley. Sheep folding beet tops and ley and ploughing in beet tops have produced more substantial increases in yield in the absence of dung than in the presence of dung. The trials have not yet reached a state of equilibrium. There is still a marked tendency for dunged treatments to increase in superiority over the others.

The trial results show the necessity of new work designed to obtained more information about the root causes of the differences between dung and straw and sulphate of ammonia and the possibility of increasing the effectiveness of the latter by the provision of supplementary fertilizers.—Authors' summary.

DRAGHETTI, A. La bietola da zucchero e la coltura del frumento. [**Sugar beet and wheat cultivation.**] *Humus, Milan* **5.** 3-5. 1949. **1383**

A cereal crop which follows sugar beet is high yielding because thinning and lodging during spring are reduced. The author explains how the taproot system of beet, well developed in the deep strata, leaves the soil in the best condition for the following crop.—E.B.

GREVE, M. Overvejelser ved roesaaningen. [**Reflections on sowing of beet seed.**] *Ugeskr. Landm.* **94.** 237-8. 1949. **1384**

Results obtained in experiments conducted in Denmark with mono-germ beet seed are reported. Eighteen kg. ordinary and 12 kg. mono-germ seed per ha. gave the same yield of roots and tops; while the yield of dry matter was 60 kg. lower per ha. from mono-germ seed, probably because the dry matter percentage was lower owing to there having been 4000 fewer plants per ha. In the experiments mono-germ seed germinated 3 to 4 days later than ordinary seed.

Results of 13 experiments carried out on Zealand in the last 2 years have shown that cross-harrowing compared with untreated has reduced the plant stand by 5 per cent and the beet yield by 3 per cent. In the same experiments cross-harrowing reduced the time of thinning by more than 20 per cent. Thinning of beet is an operation which is not suitable to be performed by machine.—R.P.J.

HADDOCK, J. L. **The influence of plant protection, soil moisture, and nitrogen fertilization on the sugar content and yield of sugar beets.** *Agron. J.* **41.** 79-84. 1949. **1385**

The effect of nitrogen fertilization, soil moisture, and spacing of the beet plants on sugar content and yield of sugar beet is reported. The results show that plant response to a modification of any one of the factors is determined to some extent by the environment created by all other factors of plant growth, for example the nitrogen requirement per acre was found to be much greater under conditions of close row spacing than under those of wide spacing. The total amount of irrigation water required to produce a crop of sugar beet in Utah seems to be of less importance than the time of application. The effect of available nitrogen on the lowering of the percentage sugar was generally accentuated under wide spacing conditions. A knowledge of the nitrogen status of the soil is essential for the production of maximum sugar per acre; when nitrogen is deficient the yield of beet is greatly reduced, and where nitrogen is present in excess the sugar percentage may be lowered. The facts given show it to be of great importance to keep the sugar beet plant growing vigorously from emergence until shortly before harvest, the most critical time in Utah being before August. Little advantage was to be gained from the application of a nitrogen side-dressing in mid-season, but the practice is most advantageous as optimum soil moisture conditions are approached.—T.D.H.

UTAH IDAHO Sugar Company. **Spring mechanization—and weed control. n.d.** pp. 34. **1386**

Practical methods by which labour can be kept to a minimum by the use of machinery for the spring cultivations of the sugar-beet crop. Seedbed preparation, seeding rate, planting equipment and methods, and irrigation for moisture control are mentioned. The methods and procedures in reducing beet populations and controlling weeds are then discussed fully, with particular reference to the uses of the harrow, side delivery rake, finger weeders, and Ro-tiller with various adaptations and modifications for this use.—G.M.W.

MANCHESTER UNIVERSITY. Faculty of Economic and Social Studies, Agricultural Economics Department (Shropshire and Staffordshire Area.) **Sugar beet costs and returns, 1948 crop.** 1949. pp. 10. [Mimeographed.] **1387**

The harvested crop was a record for the West Midlands, though the sugar content was below that of the 1947 crop. After a fall in 1947, the upward trend in the gross cost of beet production continued in 1948. Small increases in costs, particularly for singling and cleaning, occurred for all cultural operations except the autumn cultivations; all stages of harvesting costs increased. Manures cost more, and overhead costs rose by £1 16s. 0d. per acre. In this connexion it is interesting to note that the relationship between the yield of beet and the use of salt is consistent with results attained at Rothamsted.

There was a much higher yield of tops, and the average yield per acre of clean beet was 0.6 ton higher than in 1947. On aggregate, therefore, the presumed real profit per acre was only £2 1s. 2d. below the previous year's figure.

Results on the small acreages showed that in spite of the greater quantity of horse labour used, tractor labour requirements were almost equal to requirements on the large acreages. It was also evident that the cost of transport naturally varied with the yield, but was influenced too by the distance from the factory and by the method of transport. Overall costs and returns confirm that profitability is closely related to the scale of production.—A.D.H.

АДАМЕНКО, Ф. И. Улучшить работу по семеноводству сахарной свеклы. *Селек. Семеновод.* 1949. *No.* 1. стр. 21-4.

ADAMENKO, F. I. [**Improvement measures for production of sugar-beet seed.**] *Selek. Semenovod.* 1949. 21-4. [All-Union Sci. Res. Inst. Sugar Beet.] **1388**

In 1939, on the recommendation of the author, the above Institute established a series of experiments to study the effect of fertilizers on conditions of growth of mother beets (1st year), on yield of seed from these beets in the 2nd year, and on crop productivity from this seed in the 3rd year (factory material). In the 2nd and 3rd years conditions were uniform. The tests were made in the Frunze Experimental Centre (Kirgiz SSR), in the Pervomaĭsk Exptl. Sta. (Krasnodar Province), in the Zemetčinsk Exptl. Centre (Tambov Province), and in Ulado-Ljuleneck Exptl. Sta. (Vinnick Province). The results indicate the beneficial effect of normal applications of NPK. Agrotechnical measures which improve yields are also discussed. The direct relationship between percentage germination, root yields, percentage sugar in the root and total sugar yields is confirmed.—M.H.

HARTSUIJKER, K. De vergelingsziekte der bieten. [**Beet yellows.**] *Maandbl. LandbVoorlDnst* **6.** 166-9. 1949. [Phytopathological Service, Netherlands] **1389**

In this aphis-transmitted virus disease, sugar and starch becomes accumulated in the leaves, the sugar content of the root is reduced and the sugar yield of a crop, if there has been early and general infection, can be lowered by as much as 25 to 30 per cent.

A 5-year study of fodder beet (mangel) clamps has proved that these clamps harbour both virus and insect vector throughout the winter. The four spp. of insect identified included *Myzus persicae.* The question of whether the aphids can be controlled before they leave the clamps is under investigation.

Study of the course of the disease has shown that the first diseased plants are seen from mid-June to the beginning of July, after which the degree of infection depends upon the reproduction of the aphids, which in turn depends upon the weather, whether hot and dry with increased reproduction or wet and cool with reduced reproduction. Of importance is the maintenance of a close stand, the microclimate of which seems to reduce the reproduction and perhaps the general activity of the aphids. Control therefore comprises the early removal of any fodder beet clamps from the vicinity, which is the most important measure, and the early sowing of the beet crop with an ample number of plants per acre.—G.M.R.

BANGA, O. Krotenstudies, III. Vernalisatie en devernalisatie van bieten. [**Beet studies. III. Vernalization and devernalization of beets.**] *Med. Dir. Tuinbouw.* **11.** 324.-47. [English summary, p. 346] 1948. [Inst. Vered. Tuinbouwgewassen, Wageningen, Netherlands.] **1390**

The author presents a review of the literature, red and other beets being concerned. In all phases of development of beet plants the equilibrium vegetative growth ⇆ generative growth can be moved to the right or to the left. This is controlled mainly by the temperature and the day length. A relatively low temperature and a long day will move it to the right. A relatively high temperature and a short day will do the reverse. Under a long day the critical temperature is higher than under a short day.

Reference is made to the findings of Chroboczek (Cornell Agric. Exp. Sta. Mem. 154. 1934), Steinberg and Garner (*Herb. Abstr.* 6. p. 316. 1936) and M. Stout (*Herb. Abstr.* 16. Abs. 894. 1946).

If a plant is transferred from a vernalizing medium to a devernalizing medium, the effect of vernalization may appear some time afterwards in the devernalizing medium. This depends on the degree of vernalization of the plant at the end of the vernalization period and on the rate of devernalization of the new medium. If a devernalized plant is put into a vernalizing medium, some time elapses before it is vernalized.

In low temperature treatment three factors are of importance: (a) the temperature level; (b) the length of the period of exposure; (c) the age of the plant. In its very youngest stage a plant does not seem to be as sensitive to vernalization as at later stages, but even at its youngest it can be vernalized.

Chroboczek and Stout (*loc. cit.*) are quoted in reference to high temperature treatments which can neutralize certain low temperature treatments. —From author's summary.

РУБИН, Б., АРЦИХОВСКАЯ, Е. и СОКОЛОВА, Б. Об особенностях дневного и ночного обмена у растений. *Доклады Акад. Наук СССР* Том 60. *No.* 4. стр. 627-9. 1948.

RUBIN, B., ARCIHOVSKAJA, E., and SOKOLOVA, V. [**The characteristics of day and night metabolism in plants.**] *Doklady Akad. Nauk SSSR* **60.** 627-9. 1948. [Bach Inst. Biochem., Acad. Sci. USSR] **1391**

Work in the above Institute has shown that the temperature optimum of the activity of ferments, which, in plants, controls transformations of carbohydrates, is not constant. During development of the organism the optimum is displaced and reflects degree of the organism's adaptation to temperature. To elucidate the problem, study has been made of temperature optima in ferment activity of leaves during different hours of the day. The material tested was sugar beet, Ramonsk var. 1637, and leaves were both young (7 July) and old (2 Sept.) specimens. Samples were taken twice per day (8 a.m. and 12 midnight) and ferment activity was tested at 10, 20, 30 and 40°C. The results indicate that synthesis and dissolution of saccharoses are adapted to temperatures prevailing during day and night, and confirmation has been obtained of the fact that with increase in age of the leaves there is an intensifying of dissolution processes.—M.H.

UNITED STATES, Department of Agriculture. Agricultural Research Administration. Bur. Agric. and Indust. Chem. A.I.C. 193. **Report of studies on the uniformity of quality of beet sugars, No. 27. 1. Chemical and physical studies on the beet sugars of the 1947 campaign.** By *C. A. Fort* and *S. Byall*. **2. Biological studies of the 1947 beet sugars.** By *H. H. Hall* and *Dorothea J. Teunisson.* pp. 32. 1948. [Mimeographed] **1392**

Part 1 presents a tabular summary, with brief discussion of the operating data supplied by 73 beet factories in 1947 and the chemical and physical data obtained on the composite sugars. Part II gives the results of examination of the sugars for micro-organisms including thermophilic bacteric and mesophilic organisms, and also ranks the sugars in order of relative freedom from yeast growth-promoting substances which might affect the keeping quality of beverages and syrups.—K.J.S.

ARNON, D. I. **Copper enzymes in isolated chloroplasts. Polyphenoloxidase in** *Beta vulgaris. Plant Physiol.* **24.** 1-15. 1949. [Molteno Inst., Cambridge, England] [Div. Plant Nutritition, Univ. Calif., Berkeley] **1393**

Experiments are described which demonstrate that this copper protein is localized in the leaves of *Beta vulgaris*. Its activity is inhibited by cyanide, sodium diethyldithiocarbamate, and by carbon monoxide. The part played by this enzyme in the biochemical reactions linked with photosynthesis await investigation. This enzyme is not universally present in plants.—D.B.

ROOT CROPS

HASSELL, O. L. **Sweet potato growing in central Queensland.** *Qd agric. J.* **68.** 1-15. 1949. **1394**

There are thousands of acres of soil in east-central Queensland suitable for the growing of this crop. The prevailing high prices for pigs are likely to continue for some time and the possibilities for the expansion of sweet potato growing for feeding pigs in central Queensland are considerable. In view of this probable expansion, information is given on soils, propagation, varieties, planting, cultivation, rationing, harvesting and grazing of the crop by pigs.—P.M.

SKAARE, S. Rotvekstavl. [**The cultivation of root crops.**] *Norsk Landbr.* **15.** 123-4. 1949. **1395**

Where the soil is infected with club root, solid farmyard manure should not be used for cruciferous root crops. In the Hedmark region many farmers use only artificial fertilizers or liquid manure and artificial fertilizers for the root crops, and reserve the solid farmyard manure for potatoes.

The ground used for the cultivation of root crops should be well rolled preferably both before and after sowing. Where the growing period is short, quick-growing root crops, such as turnips, should be grown. Where the growing period is longer and the weather warmer, swedes and beets are suitable crops. Beets do not suffer from club root and are not nearly so severely attacked by insect pests as swedes, and as too they tolerate drought better than the cruciferous root crops their cultivation should be extended in the inland parts of Norway. Experience in 1948 confirmed the view that a narrow drill spacing should be used for beets: 50 cm. is adequate.

Tabulated data show the average yields of turnips, swedes, fodder beets, fodder sugar beets and sugar beets obtained at Vidarshov Stock-Seed Farm for a series of years (ranging from 3 years for sugar beets to 20 years for swedes).

It is found that swedes are certainly superior to turnips, but inferior to fodder sugar beets in total yield. Fodder beets on the other hand are not quite certainly superior to swedes, but fodder sugar beets and fodder beets appear to be about equal in yield according to this comparison.—R.P.J.

NORSK LANDBRUK. Rotvekstene. Deres betydning i fôringa,—og mulighetene for å apprettholde rotvekstdyrkingen under de vanskelige arbeidsforhold. [**Root crops, their importance as fodder, and the possibilities of maintaining root crop cultivation under difficult labour conditions.**] *Norsk Landbr.* **15.** 158-62. 1949. **1396**

Information is presented from addresses given at a meeting of the Society for Norwegian Welfare on 29 March, 1949, by Dr. K. Breirem (the importance of roots in milk production) and Professor B. Sakshaug (the cultivation of root crops).—R.P.J.

ELIASSON, S., and SUNDELIN, G. Foderrotfrukter. Preliminära resultat av jämförande försök med olika slag av foderrotfrukter åren 1927-1947. [**Fodder root crops. Preliminary results of comparative trials wth different kinds of fodder root crops during the period 1927-1947.**] Jordbruksförsöksanstaltens förhandsmeddelande No. 37, 1949. pp. 37. **1397**

There has been a marked decline in the cultivation of fodder root crops in Sweden during the last few decades. In the parts of the country where sugar beet is grown, this decline has to a great extent been counterbalanced by an increase in sugar beet cultivation. The importance of root crop cultivation on small farms is emphasized. Yields of roots are larger on clay soils than on sandy soils. Experiments in south and middle Sweden show that the yield of dry matter is 20 per cent higher if roots are grown after autumn-sown cereals or legumes at the beginning of the rotation than if they are cultivated after spring-sown cereals or on broken-up ley at the end of the rotation. In upper Norrland turnips after potatoes or green fodder have given 15 per cent higher yield than turnips grown after spring-sown cereals.

Experiments conducted by the Scanian Seed Production Society show clearly that in the sugar beet growing parts of Scania fodder beet and fodder sugar beet are decidedly superior to swedes in yield of dry matter and the superiority becomes still more marked if the tops are included.

In east Sweden up to the Mälar region and also in the south Swedish uplands Barres beets on the average of the trials conducted have given a higher yield of dry matter than swedes in all agricultural areas, and if tops are included the difference becomes quite considerable. Trials conducted at the Swedish Seed Association's branch stations in west Sweden indicate that swedes are better able to compete with fodder beets in this region than in east Sweden, and this is obvious also from the results from Lanna State Experiment Station.

Very few trials have been conducted in Norrland. In south and middle Norrland results are available only from Offer State Experiment Station. A comparison between these results and corresponding results from south and middle Sweden show that swedes under fairly favourable conditions are superior to turnips. Under less favourable conditions and in the interior of the area turnips are definitely more reliable in cultivation. Beets have too long a growing period for cultivation in Norrland.

In north Norrland of roots the turnip crop only is economic.

At Offer State Experiment Station as in a small number of trials in upper Norrland the potato crop has proved well able to compete with root crops. At Offer swedes have given a higher total yield of fodder units if the tops are included, but in upper Norrland the potato crop has been decidedly superior to all root crops in total yield of fodder units. The Eigenheimer variety of potato should be of great importance as a fodder producer in Norrland.—R.P.J.

Garner, H. V. **Nutrition of farm crops. V. Manuring of root crops. II. Mangolds, swedes and turnips.** *Farming* **3.** 76-80. 1949. [Rothamsted Expt. Sta.] **1398**

The manuring requirements of mangolds, swedes and turnips, and recommended rates of application N, P, K, CaO, NaCl (this for mangolds) and the minor elements, B, Mn, to these crops are described in this article. The author points out some of the disadvantages of overmanuring with certain manures and illustrates some of the mineral deficiency diseases occurring.—K.O.

Stubbs, L. L. **A new virus disease of carrots: its transmission, host range, and control.** *Aust. J. Sci. Res.* Ser. B. Biol. Sci. **1.** 303-32. 1948. **1399**

The disease occurs throughout Victoria, and has also been recorded in New South Wales, S. Australia, W. Australia, and Tasmania. The symptoms produced on carrots (*Daucus carota*) are a general stunting, chlorotic mottling and marginal reddening of the lower leaves, distortion and dwarfing of the leaflets with a longitudinal twisting of the petioles and sub-petioles. Carrots are the only known natural host plants of the virus, but the virus has been successfully transmitted to several other Umbelliferous species, in experiments. The only known vector of the disease is the aphid, *Cavariella aegopodii*, which is a serious pest of carrots apart from its role as a vector of this disease. The virus can be transmitted by core grafting, but is not sap-inoculable. There is no evidence to suggest that there is a latent period or that seed transmission is a possibility. Control of the disease must be largely dependant on eliminating or avoiding the insect vector by late sowings. The time of sowing advisable will vary greatly with the locality; in some districts late November sowings will remain healthy, while in others carrots should not be sown before mid-December. Where late spring rains occur in an abnormal season so that the aphid infestation is prolonged well into December or even January, aphid control measures should be regularly applied until the advent of normal summer temperatures prevent further multiplication of the vector. Nicotine sprays and dusts applied at weekly intervals failed to control the disease, but weekly applications of a D.D.T. emulsion almost completely eliminated the vector, significantly reduced the disease and resulted in a sixfold increase in yield of marketable roots. Various degrees of resistance to the virus exist between varieties so that there is a strong possibility of controlling the disease by the selection and breeding of resistant varieties. A Victorian strain of carrots yielded more than three times the quantity of marketable roots than the normally high yielding variety, Chantenay, did in a trial during which 100 per cent infection of all varieties occurred.—T.D.H.

Banga, O. Krotenstudies. IV. Verschillen in schietneiging bij verschillende rassen en selecties van platte of ronde kroten. **Beet studies. IV. Differences in bolting tendency of different varieties and strains of red table beets.** *Med. Dir. Tuinbouw* **11.** 724-8. [English summary, p. 728.] 1948. [Inst. Vered. Tuinbouwgewassen, Wageningen, Netherlands] **1400**

Differences in tendency to bolt in early plantings of red table beet are not due to differences in the basic varieties, but to differences in the strains. The behaviour of different varieties is described. The greatest tendency to bolt was found in strains of old types of a purple root-tissued variety which is very little used now and not kept at a high level. Bolting is controlled by temperature and length of day. The percentage of bolters, at a certain date, therefore, may differ widely in different seasons. In some of the experiments here reported, planting the seeds in March or early April resulted in more bolting than planting them in the second part of April or in May.—From author's summary.

ЕФЕЙКИН, А. К. Меристема и ускорение плодоношения сеянцев путем прививки их на плодоносящее растение. *Доклады Акад. Наук СССР* Том 59. *No.* 1. стр. 171-4. 1948.

Efeĭkin, A. K. [**The meristem and accelerating the fruiting of seedlings by grafting them on fertile plants.**] *Doklady Akad. Nauk SSSR* **59.** 171-4. 1948. [Čuvaš Agric. Inst., Čeboksary] **1401**

From experiments with *Beta vulgaris* and *Daucus carota* the author maintains that the meristems of young plants transferred to older flowering plants pass more rapidly from the formation of vegetative organs to the formation of reproductive organs. In the tests described the plants were kept above 14°C. and thus were not subject to vernalization but flowered 5 days earlier than vernalized specimens. It is stressed that the transition of the meristem of the young plants from the vegetative to the reproductive stage depends primarily on the condition of the leaf system of the plant.—M.H.

CROP BOTANY

ДАДЫКИН, В. П. Новое о корневых системах дикой и культурной растительности в районах вечной мерзлоты. *Доклады Акад. Наук СССР* Том 59. *No.* 3. стр. 577-80. 1948.

Dadykin, V. P. [**New data on the root systems of wild and cultivated plants in regions of perpetual frost.**] *Doklady Akad. Sci. SSSR* **59.** 577-80. 1948. [Obručev Inst. of Frost Investigation, Acad. Sci., USSR] **1402**

It has usually been assumed that the root systems of plants in regions of perpetual frost are localized in the upper horizons of the soil. In literature on the subject, the view supported is that the low temperature of the soil prevents root penetration to deeper layers, and that numerous root branches are developed in the layers where conditions are favourable. The author's investigations indicate that the plant may react to cold soils by thickening of the roots, by less root branching and an increase in weight. There is evidence of great capacity for wide variation in reaction of the root system to cold, from localization in upper soil layers to penetration to permanently frozen horizons.—M.H.

КАЗАРЯН, В. О. О связи между репродуктивным развитием и выживаемостью периллы в условиях темноты. *Доклады Акад. Наук СССР* Том 59. *No.* 1. стр. 175-7. 1948.

Kazarjan, V. O. [**The relation between reproductive development and survival of *Perilla* in darkness.**] *Doklady Akad. Nauk SSSR* **59.** 175-7. 1948. [Bot. Inst., Acad. Sci. Armenian SSR.] **1403**

Degree of survival in *Perilla* under prolonged darkness is closely connected with reproductive development resulting from photoperiodic induction. Plants at the flowering phase exhibit the greatest survival capacity and at the stage of vegetation and seed formation they exhibit the least survival capacity. The facts are discussed in relation to translocation of nutrient substances.—M.H.

Goedewaagen, M. A. J. Een en ander over de methodiek van het wortelonderzoek op bouw- en grasland. [**Observations on the technique of root investigations in arable land and grassland.**] *Maandbl. LandbVoorlDnst* **6.** 194-200. 1949. [T.N.O. Agric. Exp. Sta. and Soil Sci. Inst., Groningen, Netherlands] **1404**

Root studies at the Groningen Institute aim at determining (a) the effect of soil and other environmental factors on root development ; (b) root development and adaptability in relation to diverse soil types and conditions ; and (c) the amount of root formed in the different soil layers. The following methods of studying roots are described and discussed : the dry method as described by J. E. Weaver in Root development of Field Crops, 1926 ; the wet method, in which the soil is washed away, see F. H. King as cited by Weaver, *loc. cit* ; the use of a nailed board for holding the root system in position (several authors cited) ; and the use of bores. The last-named method in combination with the nailed board method is found to give good results, but the nature of the problem to be studied will govern choice of method.—G.M.R.

Bond, G. **Root nodules of bog myrtle or sweet gale** (*Myrica gale* **L.**) *Nature, Lond.* **163.** 730. 1949. [Bot. Dept., Univ. Glasgow.] **1405**

The facts recorded suggest that fixation of atmospheric nitrogen is associated with nodulated plants. The investigation, to be continued, is associated with work in progress on leguminous root nodules.—M.H.

CROP PHYSIOLOGY

Buenning, E. Die Physiologie des Wachstums und der Bewegungen. [**The physiology of growth and movement.**] 25 × 17. pp. 273. Berlin : Julius Springen. 1939. £1 7s. 0d. [Received 1949] **1406**

McKee, H. S. **Review of recent work on nitrogen metabolism.** *New Phytol.* **48.** 1-83. 1949. [Div. Food Preserv. and Trans. C.S.I.R.] **1407**

Street, H. E. **Experimental methods available for the study of the nitrogen metabolism of plants. A review of some recent advances.** *New Phytol.* **48.** 84-96. 1949. [Dept. Bot., Univ. of Nottingham] **1408**

Raalte, M. H. van. Bepalingsmethoden van ionen belangrijk voor de voeding van de plant. [**Methods of determining ions important for the nutrition of the plant.**] *Chron. Nat.* **104.** 252. 1948. [Treub Lab., Buitenzorg, Netherlands Indies] **1409**

Extract from a report on a study tour. For the plant physiologist and the agriculturist it is of importance to know what concentrations of the different ions are adequate for the normal growth of the plant, and to know also the relation between the concentration of an ion in the root environment and its uptake by the plant. Different methods of ion determination employed in the Netherlands and Britain are briefly discussed, and a colorimetric method of determining the ammonium ion, evolved at Leiden by the author and T. H. van den Honert, is outlined. It enables a concentration of 0.01 mg. per litre to be determined with sufficient accuracy, and probably can be used for the determination of other ions also.—G.M.R.

Williams, R. F. **The effects of phosphorus supply on the rates of intake of phosphorus and nitrogen and upon certain aspects of phosphorus metabolism in gramineous plants.** *Aust. J. Sci. Res.* Ser. B. Biol. Sci. **1.** 333-61. 1948. **1410**

This paper is a discussion of the theoretical aspects of phosphorus and nitrogen metabolism in plants and is based on two experiments, one with oats, the other with *Phalaris tuberosa*, in which phosphorus supply was varied and the plants harvested and examined at a number of growth stages. The experiments themselves have been reported elsewhere (*see Herb. Abstr.* 7. p. 126, 1937, and 16. Abs. 1254) and only the bare essentials are included in this paper. The author visualizes two main factors determining the rate of phosphorus intake by the plant : (1) the demand set up by the plant organs ; and (2) the concentration of the nutrient in the medium. The indirect effect of the concentration of phosphorus in the medium on its stimulation of growth and hence of demand by the plant is considered to be more important than the direct effect in determining the rate of intake of phosphorus by the plant. Even when phosphorus supply is not a limiting factor in growth the rate of intake is governed by the ability of the plant parts to accumulate this element and in their senescent phase to supply it to the younger plant parts. There is an initial rapid accumulation of phosphorus in the roots and leaves, then in the stems and finally in the inflorescences and this is accomplished with varying degrees of redistribution of phosphorus so that the element may be re-utilized many times during the life of an annual plant. Phosphorus-deficient oat plants in the experiment derived only 30 per cent of their inflorescence phosphorus by this redistribution from other plant parts, but those with an excessive supply of phosphorus derived only 93 per cent from these sources as in the latter case the phosphorus within the plant is more available than that in the external medium. The fact that the percentage phosphorus contents of the stems, leaves and roots fell ultimately to lower values with a moderate supply of phosphorus than they did with the deficient supply is explained on the basis of a more efficient re-utilization of phosphorus in the plants receiving the greater supply.—T.D.H.

АНДРЕЕВА, Т. Ф., и ЗУБКОВИЧ, Л. Е. О фотохимической активности изолированных гранул хлоропластов. *Доклады Акад. Наук СССР* Том 60. *No.* 4. стр. 681-4. 1948.

Andreeva, T. F. and Zubkovič, L. E. [**The photochemical activity of isolated chloroplasts.**] *Doklady Akad. Nauk SSSR* **60.** 681-4. 1948. [Timirjazev Inst. Pl. Physiol. Acad. Sci. USSR] **1411**

Parallel with the investigation of photochemical activity of chloroplasts, the authors studied the intensity of photosynthesis of leaves from which the suspensions were prepared. They demonstrated the secretion of oxygen in light in the presence of quinone granules isolated from the following plants : *Spinacia oleracea*, *Primula* sp. *Vicia faba*, *Phaseolus vulgaris*, *Nicotiana tabacum* and *Beta vulgaris*.

The facts indicate that changes in intensity of photosynthesis are not directly related to changes in the amount of photochemical activity in isolated granules. It is postulated that in natural conditions the intensity of photosynthesis is determined by the intensity of the dark reaction. Plant age affects the amount of photochemical activity of isolated granules and it is suggested that a lowering of this activity with age is due to a lowered intensity of plasmatic reaction.—M.H.

Galston, A. W., and Hand, Margery E. **Studies on the physiology of light action. I. Auxin and the light inhibition of growth.** *Amer. J. Bot.* **36.** 85-94. 1949. [Calif. Inst. Technology, Pasadena] **1412**

The effects of light in relation to auxin are enumerated. Several of these effects are antagonistic to one another. An attempt has been made to separate the effects and to deal entirely with the problem of response of cells to auxin as affected by illumination. Experiments were conducted on etiolated epicotyl of *Pisum sativum.* Results are summarized as follows. " When subterminal sections of etiolated pea epicotyl are excised and grown in aqueous media, their growth is dependent upon auxin concentration. However, at any given auxin level, white light decreases the amount of growth produced. This decrease is not due to differences in auxin content between darkened and illuminated tissues, but rather to a light-induced differential response to auxin. Very brief exposures to light before, during or after auxin treatment are sufficient to cause marked reductions in growth. It is suggested that a non-auxin system is responsible for the light growth inhibition."—D.B.

Sivori, E. M. Hormonas vegetales. [**Plant hormones.**] *Cienc. Invest.* **5.** 189-202. 1949. [Min. Agric., Argentine Republic] **1413**

Full treatment of the subject includes notes on the many agricultural applications of hormones such as the encouragement of rooting and tillering, the production of seedless fruits, the prevention of fruit-falling, the arresting of shoot development, the retarding of activity in plants whose development is accelerated by low temperatures, selective herbicide action, the control of flowering, the defoliation of plants before harvest, the modification of taste and texture, and the acceleration of ripening in stored fruits or the plant. There are 44 references to the literature.—G.M.R.

Audus, L. J. **Studies on the pH-relationships of root growth and its inhibition by 2,4-dichlorophenoxyacetic acid and coumarin.** *New Phytol.* **48.** 97-114. 1949. **1414**

Results of experiments on the growth of cress (*Lepidium sativum*) seedlings in water culture solutions of various concentrations and constitutions with a range of pH values (9.5 to 4.5) have shown the necessity for exercising great care in the interpretation of pH growth curves. The toxicity of particular ions and large pH drifts and gradients in the neighbourhood of the roots in weak static buffers may give rise to large distortions in the observed pH-root-growth curves. This, in conjunction with the large biological variations usually obtained under constant environmental conditions in such experiments may account for the discrepancies in the results of previous workers.

By using a constant flow of dilute culture medium maintained at a constant pH a relatively flat-topped curve was obtained for growth rate plotted against external pH. Optimum growth was at pH 5.5. It was shown that the form of this curve can be partially explained in terms of varying auxin activity, assuming that only the undissociated auxin molecule (pK = 5) is active, both as a growth promoter and as a growth inhibitor. The stimulation of the activity of lateral root meristems in acid solutions could also be explained on this basis.

The results of experiments on cress, radish, garden pea and maize seedlings show increasing root-growth inhibition by 2,4-D with decreasing pH over the range 9.5 to 4.5. These results may also be explained in terms of 2,4-D dissociation (pK = 3.28) if, as is forecast by experiments at constant pH (6.8) the inhibition is proportional to the logarithm of the concentration of active (undissociated) molecules, 2,4-D however, forms a glaring exception to the generalization that growth substances show equal activities when these latter are expressed in terms of " free acid " being approximately 450 times more active as a growth inhibitor than heteroauxin on this basis.

The root-growth inhibiting action of coumarin in cress, radish, carrot and garden pea shows no such variation with pH. There was, however, some indication that its stimulation of the activity of lateral root meristems, which occurs over the whole pH range, was greatest at the acid end.—Author's summary.

МИХАЙЛОВА, Л. В. К вопросу об обмене веществ у растений при прохождении стадии яровизации. *Доклады Акад. Наук СССР* Том 64. *No.* 6. стр. 857-60. 1949.

Mihaĭlova, L. V. [**Metabolism in plants in passing the stage of vernalization.**] *Doklady Akad. Nauk SSSR* **64.** 857-60. 1949. [Keller Lab. of Evol. Ecol.] **1415**

As sugar and nitrogen play an important part in the life of the plant, the author has studied the variation in content of these substances during the vernalization stage in cabbage, rape and winter wheat. In the two *Brassica* species, the vernalization stage is not passed in germinating seed, but in winter wheat this stage may be passed in the seed, or by the plant at any stage. Analyses of the green wheat plant of 20 days' growth cooled at 0 to +3° for 60 days are as follows :

		Control	Vernalized
Percent total sugars in abs. dry wt.		0.455	0.247
Per cent general N in abs. dry wt.		3.47	7.44
Ferments in 1 grm. abs. dry wt.	For 20 hours peroxidase	124.1	237.4
	For 10 hours invertase	13.34	8.68

—M.H.

ЗУЕВ, Л. А. Влияние различных уровней фосфатного питания на развитие молодых растений. *Почвоведение* 1949. *No.* 3. стр. 157-60.

Zuev, L. A. [**The influence of different levels of phosphate nutrition on development of young plants.**] *Počvovedenie*, 1949. No. 3. 157-60. **1416**

The study is concerned with changes in the plant of separate fractions of P-containing compounds in relation to metabolism. The material comprised samples of oats at the tillering phase in four variants of experiments made at the Kuznec Agric. Expt. Sta. as follows : (1) unfertilized plot ; (2) fertilized with N ; (3) fertilized with P ; and (4) fertilized with NPK.

There is indication that the young plants require an increased supply of phosphoric acid. With such an increase, there is in the leaves not only augmentation of the fraction of inorganic phosphoric acid, but also in the fraction of organic compounds of P, namely, phosphatides, nucleoproteids and soluble compounds of P. A direct relation was observed between the capacity of leaves to accumulate sugar and the content of phosphoproteins. While an increase in P nutrition at the beginning of the growing period improves formative processes, the same nutrient regime at another stage may seem to have an unfavourable initial effect because it does not influence yield.—M.H.

CROP BIOCHEMISTRY

КУЗИН, А. М. и ШКОЛЬНИК, Р. Я. О значении нестойких перекисей зеленого листа растения для фотосинтеза. *Доклады Акад. Наук СССР* Том 65. *No.* 5. стр. 719-22. 1949.

Kuzin, A. M. and Školjnik, R. Ja. [**The importance of unstable peroxides of the green leaf for photosynthesis.**] *Doklady Akad. Nauk SSSR* **65.** 719-22. 1949. [Bach Inst. Biochem., Acad. Sci. USSR] **1417**

The theory regarding the role of organic peroxides in photosynthesis put forward by A. N. Bach in 1893 is supported.—M.H.

Dion, G., Bedford, C. F., St. Arnaud, R. J., and Spinks, J. W. T. **Plant injury from phosphorus-32.** *Nature, Lond.* **163.** 906-7. 1949. [Depts. Soils and Chem., Univ. Saskatchewan, Saskatoon] **1418**

See *Herb. Abstr.* 19. Abs. 565. The Canadian tests indicate that no harmful effects from phosphorus-32 are produced on plants under conditions of the experiment.—M.H.

Russell, R. S., Sanders, F. K., and Bishop, O. N. **Preparation of radioautographs to show the distribution of phosphorus-32 in plant tissues.** *Nature, Lond.* **163.** 639-40. 1949. [Univ. Oxford] **1419**

Full details of the histological and radioautographic techniques (which show that in young barley plants concentration of phosphorus occurs especially in the apical meristem, the leaf primordia, the bases of the younger leaf sheaths and the initial of an adventitious root) are to be published elsewhere.—M.H.

Dworak, L. Bull. No. 6/1 State Exp. Inst. Plant Ind. A növény termelés törvénye (Termelési tudománypolitikánk utja.) [**The law of plant industry.**] *Mosonmagyaróvár.* 1947. pp. 24. [English summary pp. 23-4.] **1420**

The author applies the law of chemical equilibrium to plant industry, expressing it in the form of an equation: (t) = k (m) (s) (v). In this formula (t) is the yield produced per unit area, and k is a constant temperature. The three other symbols represent those quantitative factors which play no direct part in crop production, namely (m) the amount of seed used in sowing a unit area, (s) the amount of soil per unit area possessing the necessary factors to produce a yield, and (v) the precipitation per unit area. That is, the yield is proportional at a given temperature to the product of parts of these material factors involved in the production of a crop, but not utilized in the formation of a crop.—From English summary.

Cooper, H. P., Mitchell, J. H., and Page, N. R. **The relation of the energy properties of soil nutrients to the chemical composition of crop plants.** *Proc. Soil Sci. Soc. Amer.* **12.** 364-9. 1947. **1421**

See *Soils and Fertilizers.*

Calvin, M. and Benson, A. A. **The path of carbon in photosynthesis. IV. The identity and sequence of the intermediates in sucrose synthesis.** *Science* **109.** 140-2. 1949. **1422**

Data are given in the form of radioautographs of paper chromatograms made from extracts of algae which have been photosynthesizing for various periods; also one showing the dark fixation after a preliminary period of illumination in the absence of CO_2. The radiograms show that in the photosynthetic experiments of 30 and 90 seconds duration the major part of the newly reduced CO_2 is found in the phosphoglyceric acids, triose phosphates and the hexose phosphates. The first free carbohydrate which appears in the algae is sucrose. Free glucose and free fructose in the chromatogram are without radioactivity. It is argued that if these were intermediates in the synthesis of sucrose they would presumably appear radioactive either prior to the appearance of radioactive sucrose or simultaneously with it. It is accordingly suggested that the immediate precursors to sucrose are two hexose phosphates one presumably being glucose, one phosphate.—K.J.S.

ГОЛДОВСКИЙ, А. М. и БЕРЕСТОВСКАЯ, С. С. О соединениях калия в растении. *Доклады Акад. Наук СССР* Том 66. *No.* 1. стр. 81-4. 1949.

Goldovskiĭ, A. M. and Berestovskaja, S. S. [**Potassium compounds in plants.**] *Doklady Akad. Nauk SSSR* **66.** 81-4. 1949. [All-Union Sci. Res. Inst. for Oils, Leningrad) **1423**

There have been conflicting ideas regarding the content of potassium in plants, whether it occurs in the bound state or in ion form. The authors have studied this general problem in sunflower seeds and also the form of bound K in vegetative parts of this plant. In tests with extracts from both seeds and vegetative organs, potassium compounds are dispersed partly in the extract and partly in the residue, thus indicating that the element is not present in any one individual compound, but is bound in a series of compounds which are different in their solubility.—M.H.

ENVIRONMENTAL STUDIES

Thornthwaite, C. W., and Holzman, B. **The role of evaporation in the hydrologic cycle.** *Trans. Amer. geophys. Un.* 1939. 680-6. **1424**

Murneek, A. E., and Whyte, R. O., et al. **Vernalization and photoperiodism.** 27 × 20. pp. 211. Waltham, Mass: the Chronica Botanica Co.; London W.C. 2: Wm. Dawson and Sons, Ltd. 1948. $4.50. **1425**

This symposium contains reviews of the history to date and the present state of knowledge and research on these subjects and all the problems of crop physiology related to them. Abstracts of chapters written in languages other than English are to be found in *Fld Crop Abstr.* 2. Abs. 691, 692, 693. Titles only of the chapters in English are quoted in Abs. nos. 1426-36, which follow.

The general facts and results of experiments quoted by the various reviewers will be familiar to workers in these fields of research, but this symposium will serve as an authoritative review for the use of the general biological student who wishes to become familiar with the rapid and important developments which are being made.

The book does contain one note added in page proof to the review by Borthwick, Parker and Hendricks, reporting important experimental advances made by these workers since their contribution was written. The action spectrum for spike formation in winter barley has now been completely worked out, and has been compared with curves for cocklebur and soybean. The essential similarity of the various curves is constituted in elements requiring the same pigment or closely related pigments as the initial absorber of the radiant energy in these long- and short-day plants. In barley, moreover, the action curve for stem elongation is identical with that for floral initiation indicating that the two processes are integrally associated.—R. O. Whyte.

Whyte, R. O. **History of research in vernalization.** [Contained in] *Vernalization* and *photoperiodism*. By *A. E. Murneek* and *R. O. Whyte*. 1-38. 1948. **1426**

Murneek, A. E. **History of research in photoperiodism.** [Contained in] *Vernalization* and *photoperiodism*. By *A. E. Murneek* and *R. O. Whyte*. 39-61. 1948. **1427**

Hamner, K. C. **Hormones in relation to vernalization and photoperiodism.** [Contained in] *Vernalization* and *photoperiodism*. By *A. E. Murneek* and *R. O. Whyte*. 63-70. 1948. **1428**

Borthwick, H. A., Parker, M. W., and Hendricks, S. B. **Wave length dependence and the nature of photoperiodism.** [Contained in] *Vernalization and photoperiodism*. By *A. E. Murneek* and *R. O. Whyte*. 71-8. 1948. **1429**

Funke, G. L. **The photoperiodicity of flowering under short day with supplemental light of different wave lengths.** [Contained in] *Vernalization and photoperiodism*. By *A. E. Murneek* and *R. O. Whyte*. 79-82. 1948. **1430**

Murneek, A. E. **Nutrition and metabolism as related to photoperiodism.** [Contained in] *Vernalization and photoperiodism*. By *A. E. Murneek* and *R. O. Whyte*. 83-90. 1948. **1431**

Roberts, R. H., and Struckmeyer, B. Esther. **Anatomical and histological changes in relation to vernalization and photoperiodism.** [Contained in] *Vernalization and photoperiodism*. By *A. E. Murneek* and *R. O. Whyte*. 91-100. 1948. **1432**

Allard, H. A. **Length of day in the climates of past geological eras and its possible effects upon changes in plant life.** [Contained in] *Vernalization and photoperiodism*. By *A. E. Murneek* and *R. O. Whyte*. 101-19. 1948. **1433**

Sircar, S. M. **Vernalization and photoperiodism in the tropics.** [Contained in] *Vernalization and photoperiodism*. By *A. E. Murneek* and *R. O. Whyte*. 121-8. 1948. **1434**

Nuttonson, M. Y. **Some preliminary observations of phenological data as a tool in the study of photoperiodic and thermal requirements of various plant material.** [Contained in] *Vernalization and photoperiodism*. By *A. E. Murneek* and *R. O. Whyte*. 129-43. 1948. **1435**

Went, F. W. **Thermoperiodicity.** [Contained in] *Vernalization and photoperiodism*. By *A. E. Murneek* and *R. O. Whyte*. 145-57. 1948. **1436**

РАЗУМОВ, В. И. Академик Т. Д. Лысенко и его учение о стадийном расвитии растений. *Природа*, *Москва*, 1949. *No*. 3. стр. 30-8.

Razumov, V. I. [**Academician T. D. Lysenko and his teaching on phasic development of plants.**] *Priroda, Moskva*, 1949. No. 3. 30-8. **1437**

Following discussion of the theory of phasic development, the subject is considered in regard to agricultural practice and to Michurin's teaching on heredity.—м.н.

МАКСИМОВ, Н. А. и ГЕНКЕЛЬ, П. А. Теория стадийного расвития и ее значение для физиологии растений. *Ж. общей Биол.* Том 10. *No*. 1. стр. 3-12. 1949.

Maksimov, N. A. and Genkelj, P. A. [**The phasic development theory and its significance for plant physiology.**] *Ž. obščeǐ Biol.* **10.** 3-12. 1949. **1438**

This is a review of studies on the subject which are discussed in the light of the works of Klebs (1903), Lysenko (1935-7, and 1948) and others (Borodin, 1894; Razumov, 1930, etc.).—м.н.

Harder, R. **Vegetative and reproductive development of** *Kalanchoë blossfeldiana* **as influenced by photoperiodism.** [Contained in] Symposia Soc. Exptl. Biol. No. 2. Growth in relation to differentiation and morphogenesis. 117-38. 1948. [Bot. Dept., Univ. Göttingen] **1439**

The number of flowers and the time to flower in *K. blossfeldiana* exhibit a quantitative relationship with the daily exposure to darkness and the number of inductive photoperiods. For young plants raised in 15 hour days to the sixteen leaf stage the optimal photoperiod for flowering is 8 to 9 hours, while flowering failed in days of 12.5 hours duration. A light exposure of as little as 1 second in 24 hours gave a limited flowering response. Interruption of the optimal dark period by brief illumination reduced the flowering response and the effect of the light break was much less when it occurred near the beginning or end of the dark period. With sub-optimal flower induction is associated reduction in flower number and phyllody of the normally inconspicuous bracts. Short-day treatment profoundly affects the habit as well as flowering, inducing succulence, dwarfing and root tuberization.

When single leaves or parts of leaves were exposed to daylengths different from those of the rest of the plant, the results led to the conclusion that in short days the leaf produces a flower-forming substance which travels to the apex in the vascular bundles. A tissue exposed to long days inhibits flowering if it is situated between the locus of induction and the stem apex ; a flower-inhibiting substance is therefore postulated.

Exposure of plants to short days induces succulence and shortened internodes in the new growth. Treatment of single leaves thus affects those vertically above the treated leaf. The movement of injected berberine sulphate, which can be traced, follows a similar course, indicating that a substance (metaplasin) formed in the leaf during short day exposure may be concerned in the determination of habit. Individual leaves under long-day treatment prevent the full development of succulence in their axillary shoots when these, like the rest of the plant, are exposed to short days. Thus the existence of an antagonistic substance may be postulated.

Though the correlation between flowering and succulence is close, these phenomena appear to be controlled by the formation of different substances, since in short-day conditions, anaesthesia inhibits flowering but not succulence. Thus, at least four groups of chemical processes are at work, (1) flower promoting, (2) flower inhibiting, (3) those inducing short day habit (metaplasin, see *Planta* 31, 523-58, 1940) and (4) those inducing long-day habit. —O.N.P.

БРИЛЛИАНТ, В. А. О влиянии некоторых факторов на световые и темновые реакции фотосинтеза водных растений. *Доклады Акад. Наук СССР* Том 64. *No.* 4. стр. 567-70. 1949.

Brilliant, V. A. [**The influence of some factors on the light and dark reactions of photosynthesis in water plants.**] *Doklady Akad. Nauk SSSR* **64.** 567-70. 1949. [Komarov Bot. Inst., Acad. Sci. USSR] **1440**

Information is given regarding the effect of two factors, KCN and pH, on both phases of photosynthesis.—M.H.

САМЫГИН, Г. А. О действии сильного и слабого света, даваемого до или после темного периода, на развитие периллы и рудбекии. *Доклады Акад. Наук СССР* Том 60. *No.* 7. стр. 1265-8. 1948.

Samygin, G. A. [**The effect of strong and weak light applied before or after the dark period on development of *Perilla* and *Rudbeckia*.**] *Doklady Akad. Nauk SSSR.* **60.** 1265-8. 1948. [Timirjazev Inst. Pl. Physiol. Acad. Sci., USSR] **1441**

The author's experiments with short-day *Perilla* confirm the results obtained by Hamner (*Herb. Abstr.* 10, Abs. 1655), Mann (*Herb. Abstr.* 11, Abs. 451), and Snyder (*Herb. Abstr.* 11, Abs. 449). Tests with long-day *Rudbeckia* show that the reactions proceeding in the dark are dependent on the light reactions which occur in strong light, and this dependence is observed also in short-day plants. Strong light applied immediately before darkness strengthens the dark reactions which, in short-day plants, accelerate development but in long-day plants retard development. Further, it is observed that in *Rudbeckia* under strong light there occur still other light reactions, not connected with darkness, which influence development favourably. —M.H.

ГЕНКЕЛЬ, П. А., и МАРГОЛИНА, К. П. О причинах устойчивости суккулентов к высоким температурам. *Бот. Ж.* Том 33. *No.* 1. стр. 55-62. 1948.

Genkelj, P. A., and Margolina, K. P. [**The causes of resistance of succulents to high temperature.**] *Bot. Ž.* **33.** 55-62. 1948. [Timirjazev Inst. Pl. Physiol., Acad. Sci. USSR] **1442**

The authors have studied this problem based on the assumption that the resistance is determined by characteristics of the plasma, notably its viscosity. This has been investigated by plasmolysis and by centrifuging, with plants classified into three groups, namely, succulents, eu-xerophytes and semi-xerophytes. The content of bound water is considerably higher in succulents compared with normal mesophytes, amounting in some cacti to 70 per cent. A high viscosity and high percentage of bound water in succulents comprise the physico-chemical properties which determine resistance to high temperature. Succulents are characterized by the greatest viscosity of the plasma, eu-xerophytes by a less viscosity, and semi-xerophytes by the least degree of viscosity. A lessening or increase in this factor in xerophytes is directly related to resistance to high temperature.

At the period of flowering, plasma viscosity falls sharply in all ecological groups of plants, and simultaneously there is increase in content of bound water. Apparently the increase in amount of bound water compensates in some measure the lowering of resistance effected by fall in viscosity at this stage of development. Winter cereals, having passed the vernalization stage, have an increased content of bound water.—M.H.

ЕРМОЛАЕВА, Е. Я. и ЩЕГЛОВА, О. А. Антоциан и развитие растений. *Доклады Акад. Наук СССР* Том 60. *No.* 5. стр. 901-3. 1948.

Ermolaeva, E. Ja. and Ščeglova, O. A. [**Anthocyanin and development of the plant.**] *Doklady Akad. Nauk SSSR* **60.** 901-3. 1948. [Komarov Bot. Inst., Acad. Sci. USSR] **1443**

In the authors' many studies of the photoperiodic effect in *Perilla ocymoides* it has been observed that anthocyanin fades from the leaves under shortening day with transition of the plant from the vegetative to the reproductive phase. In this work with *P. ocymoides* and *P. nankinensis* confirmation is obtained that content of anthocyanin is lowered when the plant passes to the budding stage under the influence of the photoperiod, but remains constant when maintained at the vegetative phase under long day. There was no evidence in these tests of a direct connexion between content of anthocyanin and temperature. It is maintained that the appearance and fading of anthocyanin in *P. ocymoides* leaves and the extent of its variation in *P. nankinensis* leaves may be taken as criteria of the plants' developmental phase.—M.H.

ПОТАПЕНКО, А. О затухании фотопериодических импульсов. *Доклады Акад. Наук СССР* Том 59. *No.* 5. стр. 999-1001. 1948.

Potapenko, A. [**On the extinction of photoperiodic impulses.**] *Doklady Akad. Nauk SSSR* **59.** 999-1001. 1948. **1444**

The difficulties of studying photoperiodic impulses are due to their extreme instability, as a result of which they may be extinguished during transition in plant tissues. In Čaĭlahjan's work on *Perilla* (*Herb. Abstr.* 17. Abs. 1439) short-day leaves were in competition with long-day leaves thereby masking any photoperiodic impulse ; the present work was therefore undertaken to study the problem in the absence of competitive leaves. *Chenopodium album*, a short-day plant, has the capacity to flower at a definite stage in long day. The specimens, grown in the first place in long day and having acquired 9-10 leaves, on 17 May, 1947, were divided into the following five groups with two plants in each : (1) all leaves removed except one (the fifth from below) ; the remaining leaf kept in short-day : (2) ditto, but remaining leaf in long day : (3) control, plant without leaves kept in long day ; (4) control, plant with complete foliage in short day ; (5) control, ditto in long day.

Plants in the 3rd group died out, and data from the remainder are as follows :

Group	No. of leaves emerging from beginning to formation of panicle	
	1st plant	2nd plant
1	60	55
2	61	55
4	35	33
5	59	56

The first group is similar to the second and fifth ; thus one leaf in short day, when others are removed, does not show any accelerating effect on development although it ensures building up of plant tissues. Presumably a short-day impulse is produced but does not reach the growing tip. This occurs if the substance produced by the leaves passes first through a receptacle of nutrient substances in stems, underground organs or seeds. This aspect of the problem is discussed with special reference to " florigen." It is concluded from an analysis of *Amaranthus retroflexus* seed that " impulses " are formed but not preserved.—M.H.

МАЛЫШЕВ, А. А. Темпы развития культурных растений в горах в зависимости от температурного фактора. *Доклады Акад. Наук. СССР* Том 59. *No.* 4. стр. 771-2. 1948.

Malyšev, A. A. [**Rates of development of crops in the hills in relation to the temperature factor.**] *Doklady Akad. Nauk SSSR* **59.** 771-2. 1948. **1445**

This subject has been studied very little. During the period 1939-45 the author carried out experiments in different regions in the mountains and there was evidence that with increase in altitude the vegetative period of crop plants is generally prolonged. This, however, was not consistent because when temperature at a great height was higher than in lower levels, long-day plants in the light phase accelerated development (See abs. no. 1446). When wheat, barley, and oats are sown on different dates at high altitudes the phase from emergence to earing is shortened but the phase from earing to ripening is not changed. At high altitudes a higher temperature was observed in the first period and a lower in the second half of summer compared with data from lower altitudes. As the vernalization stage was in the pre-sowing period (artificially applied to seed by the author) it may be assumed that the phase from emergence to earing in these grasses corresponds to the light phase which crops pass through at different heights, the more quickly, the higher the temperature at this period.

The sufficient moisture and moderate continental climate of the western part of Northern

Caucasus (Teberda area) and of north-east Altaĭ (region of mountain black taĭga) are associated in the hills mostly with prolongation of the light phase in plants as of every vegetative stage. In the table the phase (in days) of emergence to flowering is given for some cultures (for wheat the phase is emergence to earing) at different heights depending on temperature at the given period of vegetation with different dates of sowing (Teberda, 1940).

A = wheat ; B = peas ; C = potatoes. 1 = average daily temperature ; 2 = duration of phase in days.

Height of sowings in metres.	A		B		C	
	1	2	1	2	1	2
1350	12.8	74	11.2	44	11.2	40
2000	10.8	80	8.1	58	8.1	54
2400	11.8	76	10.2	55	10.0	47

It is maintained that the rate of development of plants in the hills depends not on altitude as such, but on a complex of conditions which vary with height,—in the first place on temperature.

It is to be noted that as the second half of the summer at great heights in the moist mountain region is mostly colder than in lower zones, ripening is retarded and the vegetative period is lengthened (up to a month or more) although the light stage in the hills is passed through more quickly. Thus the plants behave as if they were grown in a more northerly latitude where the second half of the vegetative period is always retarded ; the colder the vegetation period, the greater the delay in development with altitude. On the contrary, the warmer the vegetation period in the same region, the greater is the possibility of accelerating the first half of the vegetation period with altitude. Generally, the delay with altitude of the process of development in crops is the most characteristic peculiarity of plants in the mountains where there is a temperate-continental and maritime type of climate.—M.H.

МАЛЫШЕВ, А. А. Суточные колебания температуры как фактор скорости развития растений. *Доклады Акад. Наук СССР* Том 59. *No.* 5. стр. 991-3. 1948.

MALYŠEV, A. A. [**Daily fluctuations in temperature as a factor of rate of development in plants.**] *Doklady Akad. Nauk SSSR* **59.** 991-3. 1948.

1446

During the course of studies, in the mountain taĭga zone of N.E. Altaĭ, on comparison of rate of plant development through an interval in altitude of 500 m. an instance was recorded in which at the 1000 m. contour, in spite of lowered average daily temperature, long-day plants with the same and also with different sowing dates, speeded up development in the light stage compared with plants at the 470 m. contour. An analysis of daily temperatures showed that the temperature in the middle of the light period of the 24 hours during vegetation was higher at the 1000 m. contour than at 470 m., whereas the average daily (24 hr.) and night temperatures were higher at the lower altitude. This inversion of temperatures occurred mainly in the period from 11-12 to 5-6 o'clock, and took place depending on the slow giving up of heat from a large expanse of water (Lake Teleckiĭ). In this region the air in the middle of the day was still not sufficiently warmed whereas on the upper hill area, the air was warmed from the soil much more quickly. The reaction of plants to increased temperature in the middle of the day showed that during the light stage they split into long- and short-day groups. The former (barley, oats, wheat, rye, flax, poppy, fennel, and potato) passed more quickly, with altitude and increased day temperature, through the phase from seedling to ear formation. The short-day plants (millet, maize, hemp, cucumber, pumpkins, haricot beans) as usual with altitude retarded their development in all phases. If development of long-day plants proceeds mainly in the light, and that of short-day plants proceeds more quickly in the dark, then the behaviour of these plants conforms with this theory.

Further study to elucidate the varying influences of day and night temperature under a uniform exposure to light (12 hours) shows that development of both long- and short-day plants proceeds most intensively under constantly increased temperature of day and night, but night cooling retards development of short-day plants more than that of long-day plants. The significance of this is discussed, while it is stressed that thermoperiodism and photoperiodism should be studied as properties of plants acquired in the course of adaptation to seasonal change of ecological factors in their regions of origin. The different intensity of processes of phasic development in the light and dark period of the day of long- and short-day plants may explain their different geographical origin. [See also Abs. no. 1445.]—M.H.

ЧАЙЛАХЯН, М. Х. и САМЫГИН, Г. А. О роли листьев в фотопериодической реакции растений длинного дня. *Доклады Акад. Наук СССР* Том 59. *No.* 1. стр. 187-90. 1948.

ČAĬLAHJAN, M. H. and SAMYGIN, G. A. [**The role of leaves in the photoperiodic reaction of long-day plants.**] *Doklady Akad. Nauk SSSR* **59.** 187-90. 1948. [Timirjazev Inst. Pl. Physiol., Acad. Sci., USSR]

1447

The decisive role of leaves in perception of the photoperiodic effect has been indicated for short-day and long-day plants. For both types of plant the photoperiodic reaction is effected only in the presence of the leaves. In long-day plants the processes of regenerative development occur only if their leaves are grown under long day, when the growth substances inducing flowering in long day are formed. In 1946 and 1947 the authors conducted tests with *Rudbeckia bicolor*, *Raphanus sativus*, *Hyoscyamus albus* and *Beta vulgaris* in order to verify the results obtained by Lang and Melchers (*Naturwissenschaft*, 5/6 82. 1941) and by Lang (*Biol. Zbl.* 78, 427, 1941) with *H. niger*. The present work indicates that long-day annuals or biennials under short day do not flower because of the absence of leaves grown under long day, and not because the leaves received short day. In uninterrupted darkness, shooting and budding of long-day plants are conditioned not, of course, as a result of photoperiodic reaction (that is, the reaction of the plants to alternation of the periods of light and darkness and the related internal physiological changes) but as a result of some other complex of reactions which are determined by substances already in the plants. Thus the explanation of the photoperiodic reaction of long-day plants given by Lang and Melchers is not justified. The transition of plants of this type to generative development is connected with the entry into their growing points of hormones of flowering from the leaves under long-day conditions.—M.H.

ЧАЙЛАХЯН, М. Х. Фотопериодизм и способность растений к цветению. *Доклады Акад. Наук СССР* Том 59. *No.* 5. стр. 1003-6. 1948.

Čaĭlahjan, M. H. [**Photoperiodism and the capacity of plants to flower.**] *Doklady Akad. Nauk SSSR* **59.** 1003-6. 1948. [Timirjazev Inst. Pl. Physiol., Acad. Sci. USSR] **1448**

The work was undertaken to determine whether typical short-day plants are capable of flowering in uninterrupted darkness or whether they are deprived of this capacity as they are in continuous light. The material comprised short-day *Perilla nankinensis* and long-day *Rudbeckia bicolor* and results not only confirm the capacity of long-day plants to flower in complete darkness but show that short-day plants also have this capacity. It is concluded that every plant species has the capacity for flowering independently of its photoperiodic character, and the author puts forward a theory of the origin of various photoperiodic groups in different latitudes. The transition of plants from vegetative to reproductive growth is due to internal physiological reactions which, even in a different complex of external factors, bring the plant to one condition of ripeness to flower.—M.H.

Hamner, K. C. **Factors governing the induction and development of reproductive structures in plants.** [Contained in] Symposia Soc. Exptl. Biol. No. 2. Growth in relation to differentiation and morphogenesis. 104-16. 1948. [U. S. Dept. Agric., Ithaca, N.Y.] **1449**

The author has analysed the problem as a whole, giving special consideration to attainment of the "ripe-to-flower" condition, treatment with low temperature, and treatment with short and long day. Difficulties arise when the reactions resulting in flowering are described in terms of phases of development and the author prefers the hypothesis of flower-initiating and leaf-forming substances.—M.H.

Carocci Buzi, V. La funzione ormonica nella vernalizzazione e nel fotoperiodismo dei vegetali. [**Hormonal function in plant vernalization and photoperiodism.**] *Humus, Milan* **5.** No. 4. 6-10. 1949. **1450**

РАЗУМОВ, В. И. и СМИРНОВА, М. И. Значение суточного температурного ритма в процессе яровизации. *Доклады Акад. Наук СССР* Том 60. *No.* 5. стр. 917-9. 1948.

Razumov, V. I. and Smirnova, M. I. [**The significance of rhythm in daily temperature for vernalization.**] *Doklady Akad. Nauk SSSR.* **60.** 917-9. 1948. [All-Union Inst. Plant Industry] **1451**

When studying the rate of vernalization of winter cereals with the usual sowing dates under field conditions, the authors observed that the stage of vernalization is not completed with the onset of winter. A calculation of the total hours necessary in the autumn for vernalization showed that this total was practically the same as that required by winter varieties for vernalization, and, in any case vernalization of winter varieties is not completed in the autumn. Under field conditions vernalization inevitably proceeds with fluctuation in temperature, but in autumn higher temperatures usually predominate over lower. In works published on this subject it is not clear whether or not vernalization is the result of a simple total of short-term intervals of low temperature. If this is the case, then the sum of these temperatures would be an indication of "winterness" of varieties.

The tests described indicate that rate of vernalization with variation in temperature is determined not only by the general total of cold hours, but also by the rhythm of cold and warm periods during the 24-hour day. For vernalization a greater number of hours with low temperature is more necessary than a long period during which there is fall from a high temperature.—M.H.

САМЫГИН, Г. А. Влияние соотношения числа часов сильного и слабого света на развитие рудбекии. *Доклады Акад. Наук СССР* Том 60. *No.* 6. стр. 1077-80. 1948.

Samygin, G. A. [**The effect of the relation between the number of hours of strong and weak light on development of** *Rudbeckia*.] *Doklady Akad. Nauk SSSR*. **60.** 1077-80. 1948. [Timirjazev Inst. Pl. Physiol., Acad. Sci. USSR] **1452**

The problem of the intensity of light necessary for the light reaction which takes place in leaves of long-day plants in the induction period needs further study, and this work with *R. bicolor* was therefore started in 1947. The experimental data recorded show that the processes which cause transition to the beginning of reproductive development may arise in leaves of the long-day plant *Rudbeckia* in long day, not only in strong sunlight but in weak light of 70 lux. This was observed only if the plant had sufficient nutrients. Apparently strong light has a favourable influence on development of long-day plants not only directly, but also through photosynthesis as a factor conditioning formation and accumulation of assimilates. This depends on the light reaction which occurs in both strong and weak light. At the same time, *Rudbeckia* shows quicker transition to shooting in 4 to 5 hours of strong light per day than in 15 hours, indicating that in strong light there takes place in the leaves some reactions slightly retarding development.—M.H.

BOOKS AND PERIODICALS

(*For other books reviewed in this issue, see Abs.*, 1032, 1044, 1056, 1090, 1097, 1105, 1137, 1152, 1153, 1154, 1161, 1215, 1233, 1327, 1358, 1406, 1425).

Osborn, F. **Our plundered planet.** 20 × 13. pp. 192. London: Faber and Faber Ltd., 24 Russell Square. 1949. 10s. 6d. **1453**

This is another warning more or less in "The Rape of the Earth" tradition; after a few general chapters introducing planetary and historical aspects, the author proceeds to discuss the effect on the earth's surface of "the new geologic force, man." He then deals with the biological cycle and life begetting life before issuing a warning regarding over-dependence on science, with special reference to artificial fertilizers versus organic matter.

The remaining chapters are devoted to a geographical survey of erosion in all continents. While admitting the tragic seriousness of the problem in these lands, one cannot but ask whether enough has now been said about the damage, and whether more attention should not now be given to the cures which will have to be adopted to conserve the soil and water of the earth for the lasting benefit of man.—R. O. Whyte.

Fussell, G. E. **The old English farming books from Fitzherbert to Tull 1523 to 1730.** 22 × 14. pp. 141. London: Crosby Lockwood and Son, Ltd., 20 Tudor Street E.C. 4. 1947. 12s 6d. **1454**

This book succeeds in its aim which is to give an account of the books dealing with English Agriculture published between 1523 and 1730. The earlier date is that which saw the publication of Fitzherbert's "Boke of Husbondrye" our first printed book on agriculture. It began a new era, and as the present author points out there has been no break in the continuity of books on agricultural matters.

The Tudor writers had very few scientific principles to guide them but they prepared the way for those coming after. Chapters 3, 4 and 5 cover the 17th century, and for convenience the period of three of the most important writers have been chosen: Markham 1600-1640, Hartlib 1641-1660 and Worlidge and Houghton 1661-1700.

The sixth chapter deals with the thirty years (1700-1730) during which Richard Bradley was the most voluminous agricultural publicist—the number of his writings rivalling those of Markham a century earlier.

Anyone who for any reason may wish to consult the early agricultural writers will be well advised first to read the book under review. It may save him much disappointment and no little vexation regarding editions. The reader is "warned that little that the writers say should be accepted as current unless it is definitely stated to have been the usual kind of farming done in a particular place. And he should be wary of dating such carefully described practices as contemporary with the issue of the book he is reading unless he has made certain that the evidence was not taken wholesale from some earlier book."

The *Old English Farming Books* is an excellent source-book as will readily be seen from the fact that the index to titles mentioned by the author covers just over nine pages.

This book should be available in the libraries of our agricultural colleges, institutes and those of the N.A.A.S.—A. R. Beddows.

Sanders, H. G., and Eley, G. **Farms of Britain.** 22 × 14. pp. 160. London. Crosby Lockwood and Sons Ltd., 20 Tudor Street. 1946. 12s. 6d. **1455**

To those who know nothing of the farming community, these eminently readable portrayals of eleven British farmers at work, will reveal the diversity of conditions prevailing in the agricultural industry, and the versatility and resourcefulness required of the individual farmer; but for the more knowledgable reader they will mean more than a series of lightly etched pictures of individual farms, for the data relating to the problems of crop rotation, seed selection, soil treatment, and live-stock manipulation, coming from farmers selected for the efficiency of their management, demand more detailed study in the light of experience. The differing conditions under which these farmers work are related clearly and simply, and provide a useful comparison not only of the complexity of farm problems, but of the diversity of practice and policy in different areas.

If the intention of the authors was to interest and stimulate rather than to instruct consciously in the art of good farm management, to reveal through experience rather than to advocate by theory, they have succeeded ably and well.—A. D. Hooper.

TOTHILL, J. D. [Editor.] **Agriculture in the Sudan being a handbook of agriculture as practised in the Anglo-Egyptian Sudan.** By numerous authors. 22 × 14. pp. xviii + 974. London. Oxford University Press. 1948. 42s. **1456**

Prior to the appearance of this work there was no general reference book on this subject. A good deal has been published in various technical journals, but the material was scattered and very incomplete. Dr. Tothill, the editor, points out that this book is " intended to be an authoritative but non-technical work of reference containing a number of background chapters all of which in one way or another help the reader to understand the varied sorts of agriculture practised in a country that extends from rainless desert to tropical rain forests, from the tradewind zone to the doldrums; from irrigation to rain agriculture; from settled areas to places where only Bedouin tribes can live; and in elevation from 408 ft. above sea level at Wadi Halfa to 10,000 ft. more or less on Jebel Marra and Mount Kineti . . . In scope the volume is intended to give a picture of progress or otherwise made in the agricultural life of the country from the time of Lord Kitchener's reoccupation in 1898 to June, 1945."

It would be impossible to do justice to this work in such a short review but an indication of the contents will give readers an idea of the monumental scope of this volume. Twenty-eight authors have contributed. The first fourteen chapters are described as 'general' and range through 'Historical background of Sudan agriculture,' vegetation, climate, geology and soils to land tenure, revenue, land fractionation, education and nutrition. The next ten chapters deal more specifically with agriculture and farm animals. They include crops, weeds, locusts, organization of agricultural research and experimental farms, review of experimental work, irrigation, animal husbandry, animal foodstuffs and fertilizers and manures. The final seven chapters are devoted to agriculture in the various provinces of the Sudan. Two appendices give bibliographies of publications on agriculture and agricultural research in the country: a glossary of Arabic and vernacular words and a first-class index is also included. The work is illustrated with over 400 plates, diagrams, maps and tables. This is indeed a first-class work and the editor, contributing authors, publishers and printers are to be congratulated on its production.—P. Mackintosh.

INDIA, **The Famine Inquiry Commission. Final Report.** 25 × 15. pp. x + 518. Madras: Manager of Publications, Delhi. 1945. 7s. 3d. [Received 1949] **1457**

Various measures have been suggested by which the threat of famine might be removed from India's future, but all of them necessitate the initial removal of that apathy and defeatism which in the past have prevented an economic and social security for the people. That a stable agricultural and economic organization throughout the country is possible is never doubted throughout this report which endeavours to show how this satisfactory development can be brought about.

There are four main parts to the report: I. Short-term aspects of the food problem; II. Population, nutrition and food policy; III. Improvement of food production and nutrition; IV. Improvement of agricultural economy. Several chapters in the first part deal with the occurrence of food shortages, particularly with the acute Bengal famine of 1943, and show how a better production policy and a more efficient distribution system can lead to adequate supplies at all time. Results of the Grow More Food campaign are also discussed and these are related in part II to the problem of nutrition. Improvement of food production and nutrition depends upon the increasing use of a number of sound agricultural developments. These are irrigation and water conservation, afforestation, fertilization and green manuring, the adaptation of improved varieties, protection against pests and diseases both during crop growth and in storage, mechanization and improvement of agricultural implements, control of malaria, maintenance of high-quality meat and milk-producing live stock, increased facilities for agricultural research and organization, extended cultivation of tubers and other high-yielding crops, employment of vegetables and fruit in the diet, development of fisheries and finally the increased use of better processing methods for foodstuffs to prevent deficiency diseases.

The last part of the report concerning the agricultural economy of the country shows how the possibilities of developing agricultural production already described can be realized. Various land tenure and other rural economic problems are discussed and the development of rural organizations to promote more co-ordination among the people is held to be essential for that new independence that India seeks to attain.—M. E. Edwards.

CROCKER, W. **Growth of plants: twenty years research at Boyce Thompson Institute.** 23 × 15. pp. v + 459. New York: Reinhold Publ. Corp., 330 West 42nd St., N.Y. 18. 1948. **1458**

It is impossible to review a review of this magnitude except to indicate its general subject matter. The chapter headings show this as follows: life span of seeds and dormancy in seeds, the physiological effects of ethylene and other unsaturated carbon-containing gases; the effect of certain lethal gases upon plants and animals; the history and nature of plant hormones, dormancy in buds, the study of plant cell membranes with special reference to cotton fibre growth, the growth of plants in controlled environments, and research on insecticides and fungicides. Every chapter has a long bibliography. The book is in fact a full version of the account of the work of the Boyce Thompson Institute already published by Faber and Faber (*Herb. Abstr.* 19, Abs. 270.)—R. O. Whyte.

BARRETT, T. J. **Harnessing the earthworm.** Introduction by *E. B. Balfour.* 22 × 14. pp. 182. Faber and Faber Limited, London. 12s. 6d. **1459**

See *Soils and Fertilizers* Vol. 12. No. 3.

WEINDLING, L. **Long vegetable fibers: Manila, sisal, jute, flax and related fibers of commerce.** 24 × 16. pp. 328. New York: Columbia University Press. 1947. **1460**

Each crop is dealt with from the point of view of geographical distribution, cultivation, industrial use and manufacture.

Fibres used for industrial purposes are grouped under three main heads, mineral, animal and vegetable. Animal fibres are mostly protein substances, while fibres of vegetable origin are composed essentially of cellulose or compounds of cellulose. The vegetable fibres can be classified according to their uses as follows: (1) fibres used for manufacture of fabrics, (2) cordage fibres, (3) brush and plaiting fibres, (4) fibres used for various forms of filling, and (5) fibres used for paper-making.

Major innovations in the textile field are likely to be in synthetic fibres rather than in natural fibres. It is not thought that synthetics will reproduce the cheaply-produced jute, sisal and Manila hemp, but the flax industry is in some danger. Two important factors to be considered are increased labour charges in the countries where fibres have been produced, and the possibility of increased mechanization of harvesting. The United States of America does not, for example, produce any of the long vegetable fibres in normal times because farm labour costs are so much higher than those in the chief long-fibre producing countries.—R. O. Whyte.

UNION OF SOVIET SOCIALIST REPUBLICS. **The situation in biological science. Proceedings of the Lenin Academy of Agricultural Sciences of the U.S.S.R. Session July 31st—Aug. 7th, 1948. Verbatim report.** 22 × 14. pp. 631. Moscow. 1949. **1461**

See *Plant Breeding Abstracts.*

REPORTS

INTERNATIONAL CROP IMPROVEMENT ASSOCIATION. **Twenty-ninth annual report.** 1947. pp. 101. [Mimeographed.] **1462**

FOOD AND AGRICULTURE ORGANIZATION. Report of the rice study group, Trivandrum, Travancore State, India, 16 May—6 June; 1947. Washington, D.C., 1947. pp. 1-58. **1463**

FOOD AND AGRICULTURE ORGANIZATION. Report of the rice meeting, Baguio, Philippines, 1-13 March, 1948. Washington, D.C., 1948. pp. 1-48. **1464**

PALESTINE, Annual Report of the activities of the Public Committee for Soil Conservation in Palestine. (2-4-45—31-3-46). pp. 20. **1465**

The growing danger from widespread erosion led to the formation of the Public Committee for Soil Conservation, and later to the appointment of a technical sub-committee to submit proposals, and to give technical instruction to farmers. The Committee obtained a Palestine Government loan and established a ten days course at the Kadoorie Agricultural School.

This report describes the organization of the Committee and the activities of the technical Sub-Committee, obstacles to the effects of erosion control, small holders' settlements and preliminary steps on the land of future settlements. Regional and local activities concern the hill settlements of varying topography, in western Galilee, Matzura, the Bashan hills and Lower Galilee, Yagur and Haifa, the settlements of the Valley of Jezreel, transitional between plains and steep hills, those of the Zone of Menasheh (slopes) and Maanit, and of the coastal zone (fruit plantations and intensive culture). There are also the settlements of the South which form a passage from the plains and coastal zone to the Negev in which the natural conditions particularly intensify the tendency to erosion. This region where some territory has already been terraced is the dust on the Committee's programme.—K.J.S.

GOLD COAST COLONY, Report on the Department of Agriculture for the year 1947-48. pp. 14. Accra, 1948. **1466**

Production of rice continues to increase steadily. Farmers are becoming more familiar with the crop and realizing the potentialities in the wetter areas which have not been fully utilized in the past. One reason for the limited production in the past was the amount of hand labour involved in cleaning the paddy. In recent years demonstrations of small power hullers have shown the growers the advantages to be derived from them.

Growers are now taking more interest in the variety and quality of rice. In Togoland many farmers are growing the white as opposed to the brown variety as the former has a better market value. The next step appears to be rice selection work and large scale seed distribution. With this end in view, the Department has selected a site for a new Agricultural Station in Nzima which will specialize in rice breeding work.—P.M.

SOUTH AFRICA, Annual Report of the Department of Agriculture for the year ended 31 August, 1948. pp. 170. Pretoria, 1949. **1467**

Production and prices of the various field crops are briefly reviewed. There are extensive sections which are applicable to the scope of this journal. They may be summarized as follows. (1) Chemical services. (2) Improvement of farming practices. (3) Business aspects of farming. (4) The dairy industry. (5) Review of agricultural research. (6) Control of insect pests. (7) Botanical surveys and control of plant diseases. (8) Education and research, with a brief outline of the work going on at the various research stations and colleges. (9) Farming in the winter-rainfall area. (10) Farming problems in Natal.—P.M.

TRINIDAD AND TOBAGO. Administration Report of the Director of Agriculture for the Year 1947 pp. 19. Trinidad, 1948. **1468**

Shortage of rice from outside sources has led to greater interest in local production. Examination of samples of locally produced rice show them to be mixtures of varieties and that there is almost always a fair proportion of red grains present. Selection programmes for isolation of pure strains have been started. At least three types will be required: (1) for areas where water can be controlled by irrigation; (2) for land which depends on local rainfall for flooding; (3) for land which gets some water but not enough for true swamp rice. Oil crops under investigation include soybean, sesame, sunflower. Limited commercial cultivation of soybean can now be recommended; new local strains of sesame and sunflower will have to be developed.—P.M.

COLONIAL OFFICE. Report of the British Guiana and British Honduras Settlement Commission. London, 1948. pp. 359. **1469**
Section Agriculture (pp. 252-8).

In *British Honduras*, forestry and lumbering dominate all other industries and there has been little chance of agricultural development. Less than 70,000 acres are cultivated annually; aerial survey shows 500,000 acres reverting to bush, an indication of the extent of shifting cultivation. Nearly 6000 persons (Mayo or Carib) are engaged in very primitive culture, the chief implements being the machete and a pointed stick for sowing. Foodstuffs are largely imported, to the value of $1.7 million in 1946.

Four settlements were planned under Government direction and assistance between 1932 to 1937; the first at Stan Creek failed largely because the settlers were not farmers. A second attempt in the same area to grow bananas with the labour of Jamaican immigrants failed, due to Panama disease. Further settlements in 1932 and 1937 with town-bred settlers also failed.

Long term shifting cultivation has given place in the Corozae District and the San Antonia reservation to short term cropping and the soil has become exhausted. Some food crops are grown for local markets and coconuts are mainly grown for export. Coconuts, citrus, bananas and sugar cane are the principal cash crops and there are schemes for developing production of these.

Maize is grown throughout the Colony on felled forest land and yields are 800 to 1400 lb/acre. Rice is grown in the south on partially cleared land or in swamps; yield is 800 to 900 lb/acre. Upland rice was grown at Punta Gorda in the war.

Live stock include horses, about 3600, cattle about 10,000, half in the Congo district; the very mixed breeds are healthy but ticks abound. Pigs and poultry could be developed. Leaf cutting and fire ants are the chief pests, with a risk of locust invasion.—K.J.S.

SARAWAK, Department of Agriculture, Annual Report for 1947. Kuching, Sarawak, 1948. pp. 19. **1470**

In this report some information not generally known, is included with regard to the general agriculture of the country.

Rice is the staple food and the main crop but local production accounts for only one-half of the requirements. Most of the crop is grown in small, scattered patches and it is estimated that there are 250,000 acres under this crop, equally divided between wet and dry paddy. Yields are low, the average for wet paddy being about 160 gantangs (1 gantang = 1 gallon), per acre and for dry paddy, 100 gantangs per acre. The nature of the cultivation and lack of uniformity of planting and harvesting make the crop liable to serious losses from pests.

Dry paddy is usually cultivated under a system of long bush fallows on steep hillsides, the slope often excceeding 45°. When land is taken in from virgin jungle, the seed is dibbled into the ashes of the burned trees in August/September. After harvesting in February/March, a bush fallow of 12 to 15 years is followed before the next crop ; succeeding crops are taken after varying fallow periods. To begin with, land is poor and yields are very low after 3 or 4 crops. As suitable land is limited falling yields and increasing population make it inevitable that a larger acreage of accessible land is worked each year with a consequent reduction in fallow periods.

When the fallow period drops to 7 years or less there is danger of the fertility of the land reaching such a low level that suitable recuperative fallow growth will not develop. When this happens a fresh patch of jungle is cleared.

Wet paddy is mainly confined to the deltas and more particularly to the banks of the main rivers. Sowing and harvesting times are similar to those for dry paddy. Large compact blocks are exceptional and permanent bunding for control of water supply is seldom seen. Fallows of 2 or 3 years are frequent ; fallow growth is burnt if the season is sufficiently dry, otherwise the litter is allowed to rot on the fields. Cultivation consists usually of turning the surface sods with a "tajak" (a small hand implement) ; transplanting from nurseries is widely employed. Increased production could be brought about by the consolidation of wet paddy cultivation into large compact blocks, adoption of uniform planting and harvesting dates throughout those blocks and possible construction and controlled drainage and/or irrigation systems on the area.—P.M.

ARGENTINE REPUBLIC. Agricultural Experiment Station, Manfredi, Province of Cordoba. Report for 1948. pp. 9. **1471**

Weather. Rainfall in 1948 was 300 mm. less than the regional average and a dry autumn was followed by a totally rainless winter, the dry period continuing throughout the spring and for part of the summer. Frequent winds of high velocity caused erosion of light soils to a degree not recorded for 30 years.

Wheat is an important crop in the Province of Cordoba and unusually good harvests were obtained in 1947, but failure to disinfect seed and the use of high-yielding but smut-susceptible varieties have led to an increasing prevalence of smut and bunt. The Station is concentrating on increasing its collection of material, now comprising some 652 varieties, and intensifying the study of its phenology and susceptibility to disease ; and in addition is demonstrating to farmers methods of controlling smut.

"Black" barley. Selection, principally for resistance to *Schizaphis graminum* (Rond.) Blanchard (=*Toxoptera graminum* Rond.), has shown 230 strains to be entirely resistant to this insect pest. These strains have been reproduced under irrigation, and further selection within this material is expected to result in the release of a new, resistant variety very shortly. "Black" barley is valuable for grazed leys, as it tolerates both drought and the trampling of animals.

Maize. Breeding objectives are earliness and resistance to drought and lodging. The drought and violent winds of the past year enabled some 50 per cent of the Station's material, which proved non-resistant, to be eliminated. Selfing is taking place in the remainder.

A one-year trial of North American commercial hybrid dent corns, with Manfredi coloured and Klein yellow Canary as controls, demonstrates the possibility of obtaining in Argentina commercial hybrids of the flint type with yield equal to or greater than that of the dents.

Rye. Comparative trials show the regional varieties to be superior to others, and selection of the regional material continues.

Sorghum. Trials of *Sorghum sudanense*, *S. almum*, *S. saccharatum*, *S. caffrorum* and others occupy 358 plots. Selection and breeding are in progress for the reduction of toxicity and for the production of a sorghum giving a good yield of forage but free of aggressive rhizomes.

Groundnuts. Groundnut breeding forms an important part of the Station's work, and attention is drawn to a new and promising selected variety of so-called Spanish type, namely, Mf 44 S 1302. For 3 successive years its production of straw and nuts has been superior to that of the coloured groundnut at present grown in the Province, and fewer nuts (40 kg. per ha.) are left in the ground under mechanical harvesting than in the case of the Provincial variety (200 kg. per ha.). A network of variety trials has been organized for the current year over an area extending as far as the Province of Santa Fe. The Station's collection of groundnuts comprises 250 varieties from Cuba, Brazil and Spain together with 3 Argentine species of *Arachis*. It is believed that the following objectives can be obtained by breeding : increased production of straw and nuts ; earliness and large-sized nuts for direct consumption ; a large proportion of nuts with high oil content for industrial purposes. Crosses are to be made during the current year, in which a wild variety, believed to be *Arachis villosa* var. *correntina*, will play a prominent part.

Experiments in labour-saving harvest methods are in progress, in which the green weight is first mown to provide a clean forage with minimal loss of leaf, the nuts being subsequently pulled out with the roots.

Sunflowers. In Cordoba sunflowers commonly appear in the cropping system as a second or catch crop, and selection aims at productive varieties combining a short growing season with uniformity in the plant and in size of seed. A large amount of varied material has been collected.

Lucerne. A special collection of individual plants selected from old lucerne cultures is being made and numbers at present about 1,000 plants which are under observation for variation.

Herbage and forage plants. Grasses (157 plots) and legumes (80 plots) are being studied for acclimatization possibilities, and under the drought and insect attacks of 1948 underwent severe tests.

Schizaphis graminum. Gammexane has been usefully employed in the control of this serious pest of cereals. Trials of different concentrations and spraying implements have been made, and preliminary trials of some other chemical controls have also been made.—G.M.R.

NEWS ITEMS AND SCIENTIFIC NOTES

Great Britain

Beet tops and vegetable waste **1472**

Beet tops and vegetable waste are being turned into high protein, low-fibre foods for all classes of live stock at the drying plant of Mr. G. Saunders, Wissington.

Products for drying are brought from the field and fed to a shredder. Shredded products are taken from the machine by wheelbarrow to drier trays. When dried, materials are fed to a Christy and Norris prebreaker, and go into a Miracle mill for grinding before sacking off. Average drying time is 2 hrs. For every 1 lb. dry matter, 5.5 lb. water have to be evaporated. The finished product has not a high β-carotene content. Its low fibre content makes it suitable for pigs and poultry. Trials are planned to test using a green crop loader with a stationary shaker at the plant, to remove dirt from the material before drying.—*Fmr's Wkly*, Feb. 18, 1949.—K.O.

Wissington drying experiment **1473**

The main difficulties with drying sugar-beet tops at the Wissington Farms Ltd. drying plant, are caused by the physical differences of the leaves and crowns, and by the soil which is picked up by the tops during handling in the field. Provided the tops are dry, under our weather conditions, a worthwhile operation is the shaking of the tops over special " creeper " shakers, which will free them from more than half the dirt. Another operation is to top the beets in the ground and to elevate the tops direct into a trailer and to carry them to the drier. The high fuel consumption required to dry the tops is a disadvantage.

Analyses of the dried tops show them to be above good quality oats in feeding value. The aim of the operators is to keep the plant at work all the year, drying high quality grass in summer, and sugar-beet tops, kale and cabbage in winter.—*Fmr's Wkly*, Feb. 18, 1949.—K.O.

Topping sugar beet **1474**

Invented by Mr. John S. Rae, a Northumberland farmer, this new topper combines efficiency, low cost and simplicity. A brief account of the prototype (the only machine at present available) is accompanied by two photographs. It consists of a beet conveyor, wide enough to span six drills, a circular saw for topping, and a cleaning unit, all mounted on two pneumatic tyred wheels and driven from the tractor power take-off. The machine moves several yards at a time, three men lifting the beet (which has been previously ploughed up) on to the conveyor. As the beet approaches the cutter, a third man centres the beet. The tops fall to the ground and the roots pass on to the cleaner which consists of five parallel ribbed or slatted boards revolving on to two crankshafts giving a forward rocking motion. After a thorough agitation the roots drop to the ground for collection. *Fm Impl. Mach. Rev.* Jan. 1, 1949.—P.M.

Highland pioneers **1475**

A description amply supplied with photographs of the Inverness-shire farms—Rehiran, Drumournie, Dalcharn, Banevan, and Ruallan, belonging to Brigadier and Mrs. G. P. Rose-Miller, shows how increased production from the land can be achieved with hard work, ingenuity, and a co-operative staff under unpromising conditions and with very little capital.

Though a few years ago the land was stockless and the steadings almost empty, to-day 4000 acres of mountain grazing carry a flock of several hundred Blackface sheep. Newly fenced land below has a Greyface flock ; arable land long out of cultivation is growing satisfactory crops of seed grain and fodder ; and dark cobbled buildings have been refashioned by farm labour into quarters for calf-rearing on novel lines.—*Fmr and Stk-Breed.* March 29, 1949.—K.O.

Changed groundnut rotation **1476**

Replying to critics in the House of Commons, the Food Minister said that though the Groundnuts Scheme may cost twice the original estimate, and would take longer than intended, the revenue was going to be much higher than the estimate. The enterprise was fully justified and it was because experiments had been made with the initial 7000 acres that the average yield (500 lb. per acre) was low. The Overseas Food Corporation thought the target of 600,000 tons could be produced from 2,000,000 acres rather than 3,250,000 acres as was originally supposed. It was not a revised yield but a revised cropping programme and a revised system of rotation. This meant that the

Corporation was intending to farm less extensively and more intensively. [See also Abs. 1488]—*Fmr's Wkly*, March 18, 1949.—K.O.

New grain dryer **1477**

The "C.P.C." (Messrs. R. Wells and Co. College Hill, London, E.C.4.) is an all-electric drier and original in design. The drier approximates 20 ft. long by 5 ft. wide and 5 ft. high. The greater part is of aluminium and prefabricated steel, thus it is sufficiently light as to be portable besides being strong. A rotatable perforated cylinder, 18 m. diameter and 18 ft. long has three sections, the first two being filled with hot air and the third acting as a cooling chamber. Capacity and method of operating depend on moisture content of the grain and are regulated mainly by raising or lowering one end of the drier by means of adjustable legs and varying the speed of the drum. Thus feeding speed of the grain can be increased or reduced according to the requirements of the grain. The machine is priced at £500 complete.—*Fm Impl. Mach. Rev.* Sept. 1 and Oct. 1, 1948.—P.M.

Norway

Cultivation of root crops **1478**

In an address delivered at a meeting of the Society for Norwegian Welfare, 29 March 1949, it was stated that the cultivation of root crops has played a very small part in fodder production. It reached its peak during the last war, when the area during several years amounted to about 250,000 dekar. Since the war there has been a considerable decline in the root crop area due primarily to the labour shortage. Possibilities exist for reducing labour consumption in the growing of root crops so that it should not be necessary to relinquish their cultivation in suitable districts. Small farms are particularly well adapted for the cultivation of root crops.—*Tidsskr. norske Landbr.* Vol. 56. pp. 89-104.—R.P.J.

Sweden

Swedish oil crop cultivation **1479**

The cultivation of oil crops in Sweden has since its resumption in 1940 increased annually, and in the current year has reached the record area of 144,000 ha. To begin with it was considered that in particular the south and south-east provinces, including Gotland, offered oil plants suitable growth conditions. Gradually it has been found that Middle Sweden—north Gotaland and Svealand—is also suitable for the growing of oil crops and the cultivation has by degrees been extended still further northwards. While Scania's share of the total oil crop area in 1942 was 82 per cent, in 1949 it had decreased to 37 per cent. One of the reasons for this has been that attacks by pests have hitherto been considerably less extensive in Middle Sweden than in the most southerly provinces. At first white mustard was the predominant species and more than 80 per cent of the total oil plant area consisted of this crop. Gradually it had to give place to spring rape and oil flax. In the current year oil flax is the most extensively grown crop with a cultivation area of 48,500 ha., followed by spring rape (41,000 ha.) and autumn rape (38,800 ha.). White mustard is grown on 14,100 ha., autumn "rybs." (*Brassica rapa oleifera*) on 3,300 ha. and spring "rybs" on 1,600 ha. *Lantm. Svenskt Land* Vol. 33, p. 612.—R.P.J.

Denmark

Seed exports **1480**

The following data are taken from "Statistisk Tabelvaerk for 1947" which was published in the middle of May this year (1949): they indicate the countries to which Danish seed is exported.

Quantity of seed (hkg) exported in 1947	*Importing countries*	
Mangel seed 6008	Germany	176
	Ireland	1414
	Norway	147
	Holland	148
	Belgium-Luxemburg	324
	France	1599
	Switzerland	23
	Czechoslovakia	2170
Fodder sugar beet 4641	Germany	986
	England	410
	Ireland	386
	Holland	21
	Belgium-Luxemburg	68
	Czechoslovakia	1082
	Austria	1592
	Hungary	75
	New Zealand	10
Other sugar beet 2982	England	10
	Ireland	10
	Finland	244
	Belgium-Luxemburg	1995
	Italy	243
	Switzerland	255
	Austria	49
	Hungary	175
Turnips 770	Sweden	42
	Finland	139
	Holland	429
	France	158
Swedes 154	Sweden	56
	France	90
Field carrots 315	England	310

Dansk Frøavl, July 15, 1949.—R.P.J.

Netherlands

Applied natural sciences **1481**

An account is given by B. Hubert in *Chronica Naturae* of the Government-sponsored Organization for Research in Applied Natural Sciences in the Netherlands, which came into being in 1930 and is generally known by the initials T.N.O. (Toegepast Natuurwetenschappelijk Onderzoek). The organization co-operates with and supports existing research institutes and experiment stations, but has some of its own. Of these only three are agricultural, two being concerned with soil science. The third is the newly-founded T.N.O. Flax Institute at Enschede, a research and advisory centre on flax cultivation. Various Commissions and Groups carry out the work of the Organization. *Chronica Naturae, Batavia.* May and November, 1948.—G.M.R.

Hungary

State Experimental Institute **1482**

A leaflet has been received (author: L. Dworak, published as Bull. 6/2 Jan. 1948) which gives in Hungarian a full account of the State Experimental Institute for Plant Industry at Mosonmagyaróvár, covering its history, organization, present staff, and results of past and present work. —R.O.W.

U.S.S.R.

Harvest prospects in the Soviet Union **1483**

According to a report received by the Ministry of Agriculture in Denmark from the Danish Government Adviser in Moscow, harvest prospects for the Soviet Union are good. The areas with cereal crops this spring were increased by approximately 5 million ha. Up to 5 June the area sown with sunflower was 316,000 ha. larger than in 1948. From the central Asiatic republics, where harvesting of winter barley has been begun, the crop is reported to be considerably larger than in 1947. On individual collective farms in Tadžik SSR yields of from 15 to 22 hkg. barley per ha. have been obtained and from Uzbekistan up to 36 hkg. barley per ha. This year for the first time large areas have been sown for multiplication of branched wheat bred by Lysenko. A yield of 8 to 10 tons wheat per ha. is expected.—*Lantbrugsraadets Meddelelser* No. 27. July 7, 1949.—R.P.J.

Italy

Rice production **1484**

In the article "Crisi risicola?" published in "*G. Agric. Domen,*" April, 1949, G. Medici writes on rice production in Italy, which involves a large number of workers at present under the threat of a crisis. He refers to the serious crisis of 1929, which required State intervention and the creation of the "Ente risi," a body supervising rice production. On that occasion, the area under rice was reduced from 161 to 137,000 ha. and production dropped from 7.6 to 6.9 million quintals, in consequence of the drop in exportation (from 2 million q. in 1927 to 684,000 q. in 1933). The situation was later restored, and in 1938 production was up to 8.2 million quintals. During war time all the rice produced was absorbed by the internal market. At present, 90 per cent of the rice fields are in the four irrigated provinces situated between the Dora Baltea and the Ticino rivers. Although the situation is not yet serious, the gradual development in this region of meadows in rotation is considered (a transformation which took place in the past in the Lombardy plain), while for the reduced area under rice emphasis is on the highest yielding varieties.—E.B.

Rice harvester **1485**

Rice harvesting in Italy requires small and mobile machines, capable of functioning also on moist soils. In *G. Agric. Domen.* of May 1949, the rice harvester B.C.S., one of the first machines of its kind, is described. In the rice fields the mowing machine B.C.S. is already widely employed. By adding special parts to this machine the rice harvester is obtained. The mowing blade is placed in the front. The draught and the movement of the various parts is given by a 4 h.p. motor. Two men are required to work the machine which covers 3600 sq. m. per hour, with a consumption of about 1.2 kg. of fuel per hour.—E.B.

Portugal

Seed exchange **1486**

The 1949 exchange list of the Estação Agronómica Nacional, Sacavém, Portugal, includes a very large number of varieties, from different parts of the world, of *Avena byzantina*, *A. sativa* sspp. *genuina*, *grandiglumis*, *nodipilosa*, *praegravis*, *A. strigosa* ssp. *glabrescens*, *Hordeum distichum*, *H. hexastichum*, *H. tetrastichum*, *Oryza sativa* ssp. *indica* and ssp. *japonica*, *Triticum compactum*, *T. durum*, *T. pyramidale*, *T. spelta*, *T. turgidum*, *T. vulgare*, 47 varieties of *Glycine soja* and 27 of *Linum usitatissimum*.—G.M.R.

East Africa

Soil and water conservation **1487**

The *Crown Colonist* of August 1949 contains a report concerning the reception of the Agricultural Bill and the Water Resources Bill intoduced for the protection of Kenya's soil and water. Local production committees have objected to the power given for compulsory acquisition in the event of a land-holder failing to comply with various provisions of the Ordinance. There appears to be every probability that this most controversial clause will be dropped.—R.O.W.

Small returns from groundnut scheme **1488**

Far smaller returns from the East African groundnut scheme will be reaped this season than were originally forecast. The development programme presented by the British Minister of Food forecast 1,230,000 acres groundnuts in 1949. The total acreage now cannot exceed 60,000 acres together with areas in southern Tanganyika planted to sunflowers.

Three chief points of criticism are:—(1) The pace of development has been forced too fast when little is known about the soil, rainfall, or the crops which can be grown economically. Not enough suitable machinery or repair equipment was obtained to clear the bush at the promised speed. (2) No proper check has been kept on stores and equipment arriving at Kongwa and other centres. (3) Lack of housing for Europeans and Africans. A recent statement by the Overseas Food Corporation intends the 49,868 acres cleared by the end of October to be under cultivation by the 1949 harvest, devoting 45 per cent to groundnuts and 55 per cent to sunflowers. Although the oil content of sunflowers is only two-thirds that of groundnuts, experience in Southern Rhodesia suggests the crop is a good preparation for groundnuts as it smothers weeds and allows time for rubbish to break down before land is used for groundnuts.

Water supply and the abrasive character of Tanganyika soil, which quickly wears out the blades of clearing machinery, are still unsolved problems.

The cost of bush clearing, building a railway and deep-water port, will mean a larger expenditure than the £25,000,000 quoted by Mr. Strachey, the British Food Minister. Progress in fitting the land for cropping is slower and crop yields are smaller than anticipated.—*Fmr's Wkly, Bloemfontein*, Dec. 22, 1948. [See also Abs. 1477]—K.O.

India

Agricultural research 1489

A brief review is given of the considerable agricultural research carried out under the auspices of the Indian Council of Agricultural Research which includes descriptions of experiments with rice, wheat, millets, pulses, oilseeds, fruits, fodder crops and grasses as well as manurial experiments and other work relating to Indian farming. *Indian Fmg* Nov. 1948.—M.E.E.

Pakistan

Jute exports 1490

The Government of Pakistan in the Ministry of Commerce announces that since circumstances have imposed a delay in the announcement of jute quotas for 1949-50, unshipped balances of current quotas may continue to be exported on the authority of existing licences until 20th August, 1949, and such shipments will not be debited to next season's quotas.—Office of the High Commissioner for Pakistan.

Pakistan cotton crop 1491

The Ministry of Food, Pakistan, issues the following : The third forecast of the area under cotton crop for the year 1948-49 is 2,911,000 acres (2,423,000 acres under American varieties and 488,000 acres under Desi) as against 3,139,000 acres (2,648,000 acres under American varieties and 491,000 acres under Desi) reported in the third forecast of the previous year, and shows a decrease of 7.3 per cent.

There is a general decrease in the acreage of this crop throughout Pakistan. The decrease in respect of American varieties is 8.5 per cent, and that in respect of Desi varieties is only 0.6 per cent.

The estimated yield of this crop is 1,046,000 bales of 400 lb. each (875,000 bales of American varieties and 171,000 bales of Desi) as against 1,210,000 bales (1,030,000 bales of American varieties and 180,000 bales of Desi) of the previous year, and shows a decrease of 13.6 per cent.

There is a general decrease in the out-turn of this crop throughout Pakistan, with the exception of East Bengal where the yield has increased by 28.6 per cent. The decrease in the out-turn of American varieties is 15.0 per cent, but that in respect of Desi varieties is only 5.0 per cent.—Office of the High Commissioner for Pakistan.

Australia

Soil drift competition 1492

Thirty-three land holders with farms totalling over 60,000 acres competed in the Eighth Annual Mallee Soil Drift Control Competition. Judging took place during early March, a period when under the dry autumn conditions usually experienced in the Mallee, faults in farm management frequently show up. The January 1949 issu of the *Journal of the Department of Agriculture, Victoria*, give an account of the competition generally and of the award which were made for soundness of management against th erosion hazard.—P.M.

U.S.A.

The Earhart Plant Research Laboratory 149

On June 7 at the California Institute of Technology a new laboratory was opened for experimental botany. It i under the direction of Dr. F. W. Went. Dr. R. A. Millikan a past president of the Institute, has called it a "phytotron" in the expectation that it may do for botany wha the cyclotron has done for physics. The laboratory consists of six air-conditioned greenhouses and thirteen air-conditioned growth chambers, in which there can be produced various conditions of light intensity and quality temperature and humidity, besides artificial rain, wind and fog. Nutrient solution is laid on to each chamber from a 1000-gallon tank. There are arrangements for the routine photographing of plants in each growth chamber. Elaborate precautions are taken to exclude plant diseases and pests from the laboratory. The laboratory cost half a million dollars to build and will cost about 40,000 dollars a year to run. Its construction involved the solution of several difficult engineering problems. Of particular interest to plant physiologists is the claim that artificial illumination of 2000 foot-candles can be secured by the use of fluorescent tubes operated at about four times the normal current density, supplemented by a few 60-watt incandescent lamps. It is stated that the life of fluorescent tubes under these conditions is still as much as 1920 hours. Plant physiologists will await with interest the results of research from this novel laboratory. *Nature, Lond.* June 25, 1949.—M.H.

Toxic residues 1494

It was announced that the U.S. Food and Drug Administration will ban dairy products from inter-State commerce if found to be contaminated by DDT residues. No tolerance will be allowed of DDT in milk or food product. This bars the use of DDT in fly sprays for dairy cows or dairies. The substitutes recommended are methoxychlor, a DDT analogue, and pyrethrum or organic thiocyanate compounds. DDT may still be used for controlling insect pests on other live stock including beef cattle, and DDT, chlordane and BHC may be used for controlling flies in and around farm buildings other than dairy farms and milk processing buildings.

This official pronouncement aroused much discussion and consternation at the necessity for re-educating the farmer in the choice of sprays, especially when information regarding the newer sprays is meagre.

No highly effective insecticide has been found for horse flies ; for fleece wormfly DDT and BHC are useful and chlordane and toxaphene give protection for 8 to 10 weeks. All chlorinated compounds are effective against lice, and chlordane, toxaphene and a DDT-BHC combination against ticks.

The build-up of resistance to DDT by flies was noticed; very little resistance to gamma BHC was found and good results were obtained with chlordane.

Parathion should not be used on food crops less than 30 days before harvest.

In feeding tests on cows and sheep using pea vines treated with DDT no ill effects were noticed but the cows showed appreciable amounts of DDT in their fat.—*Agric. Chem.* April, 1949.—K.J.S.

Ryania insecticides 1495

Insecticides derived from the stem wood of *Ryania speciosa* have proved toxic to a wide range of insects, harmless to man in application or as a crop residue and nonphytocidal. *Ryania* is particularly recommended for cornborer control.

The active principle Ryanodine, from *R. speciosa* is alkaloidal and has about 700 times the potency of the stem wood. The action appears to be that of a general depressant, causing relatively rapid cessation of feeding and general flaccid paralysis of the insect. The history, application and lethal dosages for certain insects are described. *Agric. Chem.* May, 1949.—K.J.S.

Argentina

Burlap 1496

Up to the present the Argentine Republic has been dependent on Indian jute for the manufacture of sacking for its cereal crops. A method of converting the waste straw of the linseed crops into burlap has been discovered, and it is believed that this can now be developed so as to cover all the country's requirements in sacking.—*M.A.N.* Oct.-Nov. 1948.—G.M.R.

Peru

Agricultural education 1497

Peru is fundamentally an agricultural country, and 62.5 per cent of the population are engaged in agriculture and stock raising. But of the Peruvian University students only 4 per cent were studying agriculture in 1945, the remainder being destined for the following professions: medical, 40 per cent; law, arts, education and economics, 35 per cent; the armed forces and police, 14 per cent; engineering, 7 per cent. In a pamphlet published in 1947 by SCIPA, an inter-American Co-operative Service for Food Production, E. Harrison, W. P. Arca and V. D. Stauffer stress the anomaly of this position, and urge Peru to face the problem and attract intelligent young men to the scientific study of agriculture and veterinary science. —G.M.R.

Uruguay

The Uruguayan Association for the Advancement of Science 1498

The Association has just been established under the Presidency of Professor Clemente Estable. For the better achievement of its aims, it has initiated a census of all institutes and persons devoted to scientific study, education and research in Uruguay.

A similar census for the other Latin American countries is being made by UNESCO's centre of Scientific Cooperation in Latin America at Montevideo, Avenida Agraciada 1875, with which scientists interested may communicate. *Cienc. Invest.* May, 1949.—G.M.R.

South America

First South American Congress of Research Workers in Agronomy. 1499

This Congress is to take place in Uruguay from November 13th to 19th, 1949, and it is believed that some 300 research workers will participate. About 70 will come from Uruguay, another 70 from Brazil and possibly 80 from Argentina, the remainder from other South American countries, some from the United States. The Congress will comprise five Sections devoted to (1) Climate and soil, or general ecological questions; (2) Crop and herbage husbandry; (3) Animal husbandry; (4) The industrialization of agricultural products; (5) Agriculture and the man, or rural sociology and economics including marketing problems. The meeting place of the Congress is the Uruguayan Experiment Station at La Estanzuela, suitable alike for its relatively central situation and for the appropriateness of this well-equipped institution with its long record of service to South American agricultural research.

The impetus for the Congress came from Brazil, where Dr. Álvaro Xavier, Director of Agriculture for the State of Rio Grande do Sul, proposed that a continental conference of this nature should be summoned at La Estanzuela. The Government of Uruguay sponsors the Congress and the actual organization is in the hands of a Uruguayan Committee composed of representatives of the Government and University authorities under the presidency of Dr. A. Boerger, Director of La Estanzuela. The Governments of Argentina and Brazil are also giving official recognition to the Congress. Although at the outset the Congress may consider more particularly such problems as are concerned with the La Plata region and are common to the three countries mentioned, the scope of activities is widening and every effort is being made to achieve a " round table " type of deliberation. The problems to be attacked are such as have no national frontiers but are confined solely by ecological limits, and fruitful results are confidently expected.—Special communication to the Bureau.—G.M.R.

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